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SCIENCE AND TECHNOLOGY ACT OF 1958

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HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON GOVERNMENT OPERATIONS UNITED STATES SENATE

EIGHTY-FIFTH CONGRESS

SECOND SESSION

ON

S. 3126

EXPANSION OF FEDERAL PROGRAM FOR COORDINATION OF SCIENTIFIC INFORMATION AND DOCUMENTATION (TITLE I)

AND

S. 4039

TO AUTHORIZE THE EXPENDITURE OF FUNDS THROUGH GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH (TITLE II OF S. 3126)

JUNE 25 AND 26, 1958

PART 2

Printed for the use of the Committee on Government Operations

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SCIENCE AND TECHNOLOGY ACT OF 1958

WEDNESDAY, JUNE 25, 1958

UNITED STATES SENATE,
COMMITTEE ON GOVERNMENT OPERATIONS,
SUBCOMMITTEE ON REORGANIZATION,
Washington, D. C.

The subcommittee met, pursuant to adjournment, at 9:10 a. m., in room 357, Senate Office Building, Senator Hubert H. Humphrey (chairman of the subcommittee) presiding.

Present: Senators Humphrey, Smith of Maine, and Martin of Iowa.

Staff members present: Walter L. Reynolds, chief clerk and staff director; Ann M. Grickis, assistant chief clerk; Eli E. Nobleman, and W. E. O'Brien, professional staff members.

Senator HUMPHREY. The subcommittee will come to order. The hearings this morning will be on the two bills that are before us, S. 3126 and S. 4039; at least one section of title I of S. 3126 is under consideration.

These hearings are a continuation of the efforts of the Subcommittee on Reorganization to obtain constructive information from available sources on the question of the proposed establishment of a Federal center for the improvement of scientific and technical information services. At the previous hearings held May 2, 6, and 7, 1958, the subcommittee received testimony from representatives of various non-Federal agencies, groups, and individuals who are active in this field, in an effort to develop the facts relative to the extent of operations of existing private facilities in assembling, abstracting, indexing, retrieving, collating, storing, and disseminating scientific data, as well as their recommendations as to the extent that the Federal Government should participate in the formulation of a coordinated program.

The hearings today have been called for the purpose of receiving the views and recommendations of representatives of Federal agencies who are engaged in activities directly related to these programs. Through these hearings the subcommittee will endeavor to develop the essential facts relative to the present operation of Federal agencies, any deficiencies in existing programs, and the need for improvement of Federal services in the documentation field. It is believed that such information will not only be of great assistance to Members and committees of the Congress, but that the documented hearings will afford a medium for study by responsible officials of the Government in developing and expanding existing programs directed toward the coordination of scientific information and the improvement of the Federal documentation procedures.

The hearings today will also be directed toward another bill, S. 4039, which I introduced in the Senate on June 20, 1958, in response to a

request received from Dr. Alan T. Waterman, Director of the National Science Foundation, to authorize the expenditure of funds through grants for support of scientific research. This proposal is in general accord with the objectives set forth in title II of S. 3126, the proposed Science and Technology Act of 1958. Those agencies which would be primarily affected through the enactment of this proposed legislation have been requested to submit their views on this proposal, as well as on the program for coordination of scientific information. Although there are probably a number of Federal agencies that will find this new authority to be helpful in developing programs in basic science research, specific testimony will be supplied to the subcommittee by the Director of the National Science Foundation and by representatives of the Departments of Defense and Commerce and the Atomic Energy Commission, who are scheduled to appear before the subcommittee at the hearings today and tomorrow.

At this point I wish to include in the record a copy of S. 4039, together with an explanatory statement of the bill submitted to the Senate by Dr. Waterman. Also, I wish to include in the record a copy of a letter I addressed to Dr. Waterman under date of May 28 relative to the possible submission of proposed legislation dealing with the proposed establishment of a Federal Board of Scientific Documentation for the improvement and coordination of scientific and technical information services, together with his reply dated June 20, 1958.

(The documents referred to are as follows:)

[S. 4039, 85th Cong., 2d sess.]

A BILL To authorize the expenditure of funds through grants for support of scientific research, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at institutions of higher education or other nonprofit organizations, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make such grants, or to make contracts for the conduct of basic or applied scientific research at institutions of higher education or other nonprofit organizations, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

NATIONAL SCIENCE FOUNDATION,
Washington, D. C., June 18, 1958.

Hon. RICHARD M. NIXON,
President of the Senate, Washington, D. C.

MY DEAR MR. PRESIDENT: The National Science Foundation, in accordance with its statutory authority to encourage the pursuit of national policies for the promotion of basic research and education in the sciences, herewith transmits a legislative proposal, together with an attached explanation, which would authorize agencies of the Federal Government engaged in support of basic scientific research at institutions of higher education or other nonprofit organizations, to make grants for the support of such basic scientific research, and to vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with grant or contract funds provided for the support or conduct of such research.

The Bureau of the Budget has advised us that it has no objection to the submission of this legislation.

Sincerely yours,

ALAN T. WATERMAN, *Director.*

Explanation of Draft Bill Dealing With Extension of Granting Authority to Additional Agencies and Vestment of Title to Equipment Procured With Grant or Contract Funds

1. Use of grants for the federal support of basic scientific research at institutions of higher education and other nonprofit organizations

Nature of basic research

Basic research is that type of research which is directed toward increase of knowledge in science. It is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.

Present responsibilities of Federal agencies for the conduct and support of basic research

Section 4 of Executive Order 10521, dated March 14, 1954, states:

Section 4. As now or hereafter authorized or permitted by law, the Foundation shall be increasingly responsible for providing support by the Federal Government for general-purpose basic research through contracts and grants. The conduct and support by other Federal agencies of basic research in areas which are closely related to their missions is recognized as important and desirable, especially in response to current national needs, and shall continue.

Magnitude and scope of present Federal financing of basic research

Total obligations for basic research during fiscal year 1958 will probably fall somewhere in the range of 200 to 250 million dollars. This basic research will be carried on primarily in Federal laboratories, in research centers operated under contract for the Government, and within colleges and universities under grants and contracts from various Federal agencies. With respect to this third category, it is estimated that Federal obligations in the current fiscal year will be somewhere in the neighborhood of $100 million. While precise data are not available on this point, it would appear that around 50 to 60 percent of federally financed basic research at colleges and universities is supported by grant and 40 to 50 percent supported by contract. Agencies currently engaged in supporting basic research at colleges and universities include the Departments of Agriculture; Army, Navy, and Air Force; Health, Education, and Welfare; Interior; Commerce; Atomic Energy Commission; National Advisory Committee for Aeronautics; and the National Science Foundation. Of these, HEW, NSF, and Agriculture have authority to make grants; the others do not.

Advantages of the grant over the contract

Where the Government desires to engage the services of an educational or nonprofit organization for the conduct of a specific piece of research directed toward a specific problem, the use of the contract form is obviously in order. On the other hand, where it is the desire of the Government to stimulate and support fundamental research in a given field, with the perimeters of inquiry limited only by the curiosity and creativity of the scientific investigator, the use of the grant form has several marked advantages.

First, the psychological relationship between the recipient institution or individual and the Government is more in keeping with the concept of maximum freedom of action for the scientific investigator. Second, the problem is avoided of endeavoring to adapt detailed contract regulations designed primarily for the procurement of hardware to the support of creative, fundamental research. Third, advance payment of the grant can be made without the vouchering of expenditures and accompanying progress reports or other proof of work—both of which exercise a deadening effect upon the initiative of the scientist.

The accompanying bill is designed to enable agencies not now having such authority to exercise discretion as to the legal instrument to be used in the support of basic research at educational institutions or other nonprofit organizations. The authority requested would be permissive not mandatory in character. If a particular undertaking were relatively narrow in scope, or if the agency for any reason desired to maintain a fairly close rein on the pursuit of the research, it could use the contract form. Conversely, if it were the agencies' desire in other cases to support fundamental research in a broad field, with full latitude for the choice of particular lines of inquiry, the grant instrument could be used.

2. TITLE TO EQUIPMENT

One of the most troublesome administrative problems involved in the Federal support of research at colleges and universities concerns the disposition of property and equipment to which the Government retains title. Although appendix C of the Armed Services Procurement Regulations issued in July 1952 had the effect of improving regulations previously in force, the present situation continues unsatisfactory from the viewpoints of both educational institutions and the Government. The time and expense involved in keeping records of equipment may often exceed the original value of the equipment. There is unnecessary variation in the records required by different agencies and needless duplication of records by universities (despite the fact that appendix C of ASPR assigns to the contractor the primary responsibility for recordkeeping). Much time and labor is frequently spent after termination of research contracts in the formal and often fruitless circulation throughout the Government of long lists of highly specialized equipment, particularly with respect to minor items of equipment. Furthermore, in many cases, it would be prohibitively costly to relocate major items of equipment back into a Government warehouse.

Generally, two reasons account for the retention of title by the Government to equipment obtained with Federal funds. One is of a legal character, agencies being unable to transfer title to Government property without further obligation to the Government in the absence of some tangible consideration; second is the feeling on the part of agencies that, conceivably, the Government might have need for the equipment at a different location after the termination of the research. In order to meet these two problems and to simultaneously protect the Government's interest, it is recommended that legislative authority be sought which would authorize Federal agencies supporting or contracting for research and development work at educational or nonprofit institutions to provide in the grants or contracts that title to equipment financed by the agency in connection with the research would rest with the institution without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate.

UNITED STATES SENATE,
COMMITTEE ON GOVERNMENT OPERATIONS,
May 28, 1958.

Dr. ALAN T. WATERMAN,
Director, National Science Foundation,
Washington, D. C.

DEAR DR. WATERMAN: Following recent hearings conducted by the Subcommittee on Reorganization on that section of the bill S. 3126 which relates to the proposed establishment of a Federal center for the improvement of the scientific and technical information services, private and governmental, it was suggested that legislation of similar import to the Airways Modernization Act of 1957, Public Law 85–133, a copy of which is attached, be considered as a possible solution to determining the appropriate procedures and the extent of Government participation in the program.

The subcommittee would, therefore, appreciate it if you and other officials of the National Science Foundation who are familiar with existing programs in both the private and public fields would give consideration to this suggestion and submit your views as to possible establishment of a Board of Scientific Documentation.

Should the suggestion be deemed to have merit, it will also be appreciated if you will designate officials of the National Science Foundation to cooperate with the members of the staff of this committee in developing draft legislation designed to cover the fields of documentation involved, for consideration by the subcommittee when the hearings are resumed on June 25 and 26.

Although I have no definite preconceptions as to the utilization of such a program, or as to which Federal or non-Federal agencies should be represented on such a Board, it would be my suggestion that consideration be given to appointing a Chairman of the Board who might be selected by the President after consultation with private groups engaged in the abstracting, translation, documentation, storage, and dissemination fields, and that representatives of the NSF, AEC, CIA, Departments of Defense, Commerce and Health, Education, and Welfare, and possibly others such as the Department of State, might be considered for appointment to such a Board. In view of the tremendous interest manifested in this program on the part of private groups, it might be well to

also consider the possibility of appointing some representatives from the abstracting and documentation fields now supported by private funds.

I am submitting this suggestion to you for your consideration and recommendations, merely as a possible approach to a solution to the problems involved. Should there be any reason why you feel this type of organization would not be effective, the subcommittee will, of course, be glad to have your own suggestions, based on the testimony and recommendations submitted to the subcommittee at its recent hearings on this subject, and upon your own wide knowledge of the existing deficiencies and the need for improvement of these functions.

Thanking you for your consideration of this matter, I am,

Sincerely yours,

HUBERT H. HUMPHREY,
Chairman, Subcommittee on Reorganization.

NATIONAL SCIENCE FOUNDATION,
Washington, D. C., June 20, 1958.

Hon. HUBERT H. HUMPHREY,
Government Operations Committee,
United States Senate, Washington, D. C.

MY DEAR SENATOR HUMPHREY: Your letter of May 28, 1958, regarding that section of S. 3126 which relates to the proposed establishment of a Federal center for the improvement of scientific and technical information services, private and governmental, and suggests that a Board of Scientific Documentation similar to the Airways Modernization Board might be established, has been discussed and considered carefully in the Foundation and by others interested in this problem.

The National Science Foundation has been aware of the possibilities in this field for some time and has devoted considerable effort to an examination of scientific information problems in the United States. We believe that, in developing more efficient and comprehensive exchanges of scientific information, it is important to maintain and improve the independent scientific information services presently operating. Many programs have been suggested and are now being implemented, organized, or planned in cooperation with other groups. We feel that the best progress can be made by concentrating on the program we are now developing. Such a procedure will permit us to attack now the problems in scientific information without increasing the complexities of Government coordination and organization and without enlarging the number of boards working in this field.

If, however, after another 6 months or year it appears that our present method of solving the information problems is not practical and is not effective, then perhaps we should give new consideration to the formation of such a Board.

Please be assured that we will be happy to cooperate with the members of the staff of your subcommittee in discussing legislation designed to improve these functions.

If there are any further questions you may have, we will be glad to discuss the matter further.

Sincerely yours,

ALAN T. WATERMAN, *Director.*

Senator HUMPHREY. At the hearings held in May, the subcommittee directed the staff, in cooperation with the National Science Foundation and appropriate Federal agencies, to compile information dealing with the international aspects of scientific documentation and exchange of information. Considerable material has been prepared on this subject, and I shall include in the record at the conclusion of the hearings, to be printed as an appendix,[1] a staff memorandum and supporting data from the participating agencies concerning this subject.

I also wish to include in the record, at the appropriate place, letters received from scientists, groups, and other interested individuals who have commented on or submitted suggestions relative to the various provisions of S. 3126.

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[1] (See p. 495.)

I am particularly happy to include in the hearings an unpublished article, November 1957, by Dr. A. Hunter Dupree of the Department of History of the University of California, a recognized scholar and author on the relationships of Government and science. The article, entitled "The Real Challenge to Dr. Killian," is a thoughtful and comprehensive commentary on the problems involved in some of the provisions of S. 3126, and is especially significant in the present consideration of proper governmental organization and coordination of functions of the Federal Government in the field of science activities. Extracts from Dr. Duprec's recent book "Science in the Federal Government: A History of Policies and Activities to 1940" (Belknap Press of Harvard University, 1957) were included in the staff analysis and summary of the proposed Science and Technology Act of 1958, which was printed as Senate Document No. 90 (pp. 88, 100–105).

The article submitted to the subcommittee by Dr. Dupree is a further contribution by him of great importance to our study of this subject and is worthy of searching consideration by all persons concerned and interested in the effective reorganization of science activities of the Federal Government. Although Dr. Duprec agrees with many scientists, that the question of creating a Department of Science must be considered very carefully before any action is taken by the Congress in enacting appropriate legislation in this area, he, unlike most scientists, sets forth cogent and constructive reasons in support of his view. The article submitted to the subcommittee by Dr. Duprec is the kind of information that is sought and needed by the Congress in its consideration of legislation dealing with Federal science activities.

(The above-mentioned article with accompanying letter follows:)

UNIVERSITY OF CALIFORNIA,
DEPARTMENT OF HISTORY,
Berkeley, Calif., June 20, 1958.

MR. WALTER L. REYNOLDS,
Staff Director, Committee on Government Operations,
United States Senate, Washington, D. C.

DEAR MR. REYNOLDS: I have greatly appreciated receiving both the analysis and summary and the hearings on S. 3126, Science and Technology Act of 1958. I was especially pleased that parts of my book, Science in the Federal Government, were included in the summary, for I feel that what it had to say is germane to the problem with which you are wrestling.

Last November I tried to collect my thoughts on this subject in an article. While it is unpublished and in some respects now out of date, I am enclosing a copy for the use of your committee. If it serves any purpose at all for you, I shall be gratified; if it serves none, no harm is done. I felt in the material you sent me that the point of view on a Department of Science expressed in this article was largely absent. A number of people were quoted as opposing a Department of Science because it might have too much power in the administration of science and in the limitation of the freedom of science. My doubts about a department stem from somewhat different grounds—that a department such as the one outlined in S. 3126 would be inadequate to serve as the kind of central scientific organization that is needed.

Sincerely yours,

A. HUNTER DUPREE.

THE REAL CHALLENGE TO DR. KILLIAN

By A. Hunter Duprce

Throughout the Nation's history men have vacillated between two views of the relation of democracy to science. On one hand Americans have always felt that their free political institutions and the freedom of science are a natural

combination, infinitely superior to any society in which science is subjected to censorship and stultifying authoritarian control. Yet at the same time Americans have usually viewed with alarm their actual efforts to support science and have been ready to believe that their inability to take swift and even dictatorial action in this field gives rival nations a tremendous advantage over them. Whether political freedom, the freedom of science, and effective organization can exist together is a question on which the Nation now must make up its mind.

Sputnik has at last made some Americans realize that they need a central scientific organization. The comfortable belief is waning that the vast research activities both inside the Government and outside of it can achieve their goals without reference to one another. Senators call for a Department of Science presided over by a Secretary of Science in the President's cabinet. A staff report of a congressional committee calls for both a Department of Science and a science academy. A former Assistant Secretary of Defense emphasizes the complexity of the missile program by publishing a maze of an organization chart in a popular magazine. More importantly and concretely, President Eisenhower has appointed a special assistant for science and technology, Dr. James R. Killian of the Massachusetts Institute of Technology.

Dr. Killian may be aware that his distinguished predecessor as President of MIT also anticipated him in a venture in central scientific organization. In another national crisis, Karl T. Compton was on a ship between Boston and Bangor, Maine, when he received a radiogram from his assistant that President Franklin D. Roosevelt had appointed him chairman of a committee to reorganize Federal Government. The Science Advisory Board of 1933, to which this message referred, was a much more modest affair. Indeed it had to depend on private sources for its support. But Karl Compton in his day tried to put science to work in a Nation struggling against economic depression.

Although the Science Advisory Board of 1933–1935 did not succeed in gaining a foothold in the Government hierarchy, both Compton and Killian are a part of a quest for a central scientific organization that has gone on since the founding of the Republic. Some institution that would provide the Government with the advice of scientists at the same time that it coordinated the Nation's ever-growing research activities has been the goal of statesmen and scientists alike in every generation. George Washington, Thomas Jefferson, James Madison, and John Quincy Adams held in common the ideal of a national university which would provide both research and advanced scientific education. In the 1840's a short-lived National Institute for the Promotion of Science tried to provide a center for the Government's exploring expeditions. In 1863 a decade of discussion ended in the establishment by Congress of the National Academy of Sciences. Although it was supposed to serve as scientific adviser to the Government, its major function soon became the providing of some reward for excellence in basic research through the honor of election.

At the time of World War I, when the Government first really faced the need to mobilize science as the key to survival in war, President Woodrow Wilson created the National Research Council. It spawned some of the military research agencies and coordinated the use of scientific personnel in 1917 and 1918, surviving into the period of peace. But a crisis of the magnitude of the depression found the Government still seeking an effective central scientific organization with the appointment of Compton's ill-starred Science Advisory Board.

World War II produced yet another venture, and the Office of Scientific Research and Development under Vannevar Bush (MIT has a recurrent connection with this problem) became the nearest thing to a live, functioning central scientific organization which the Nation has ever produced. But Bush and his staff clearly recognized that their solution was tailored not only for all-out war, but for the particular kind of shortcoming which plagued the regular military research programs in World War II. They not only planned for their own demise at the end of the emergency, but they hoped that in their place a great national research foundation would arise which would provide for basic research on an unprecedented scale.

Congress did indeed create a National Science Foundation, but only in 1950, after the lines of authority and persuasion built up by the OSRD had long since dissipated in the dizzily evolving structure of the Department of Defense. The National Science Foundation, even in its early years of miniature appropriations, became the protector of the ideal of basic science as opposed to its applications. This cause so badly needs an advocate that the Foundation has not yet achieved anything like its full potential in the sponsorship of basic research. But that other function, to develop a science policy for the Government, has remained largely dormant. This long record of unfulfilled hopes for a central scientific

organization holds within it some clues which can guide the country as to what cannot be done and should not be tried today. Of all the panaceas the one with the most surface appeal and plausibility is the Department of Science. With a Secretary sitting in the Cabinet, so this vision goes, science would have rank. Yet this whole idea was turned inside out between 1884 and 1886 before the Allison Commission, a joint congressional committee, and found wanting. Already by that time the prospect of amputating scientific bureaus from their historic places close to operating units appeared forbidding, and by not it is a thousand times more formidable. What friend of the Department of Agriculture would stand idly by while the entire Agricultural Research Service, the very center of the Department, moved to another jurisdiction. If by chance the Department of Science assembled a constellation of research agencies, could it administer them effectively far from the problems they are supposed to solve? Gifford Pinchot had a crusty description for this kind of reorganization back in Theodore Roosevelt's day. It would be, he said, about as reasonable to give all chemistry in the Government service to one central laboratory as to confine all typewriting to a single bureau. Science has permeated the whole of the Government structure as well as the rest of 20th-century society.

If a secretary of science contented himself with trying to coordinate activities which remained the responsibility of his peers in the cabinet, he would find himself immediately at loggerheads with men who had as much power as he and an infinitely stronger entrenched position. The department of science, instead of being too strong a departure, is an inadequate remedy to science's lack of stature.

An alternative which has a wistful attractiveness to many scientists is to let the National Academy of Science come into its own as the adviser to the Government. Membership in the National Academy is a high honor. Yet it began as a group of 50 individuals incorporated by name into the Academy and possessing complete power of self-perpetuation. Even if such a group, responsible to no one, may be said to stand for the scientific community by a kind of mystic virtual representation, it can hardly expect to convince responsible public officials to bind themselves to its advice in advance. It has also developed no mechanism for giving the kind of continuous, high-pressure, advice which the Government so badly needs. Even the creature of the Academy, the National Research Council, which has a valuable role as a focus for scientific and engineering societies, has always proved inadequate to the general task of a central scientific organization in a serious crisis.

The National Science Foundation has an advantage over the National Academy in that its chain of command within the Government leads directly to the President. But because of its late start, its financially threadbare beginnings, and its own conception of its role, the Foundation has largely concentrated on fostering the deserving orphan, basic research. Here the Foundation has its work to do, but it has refrained from giving free advice to the more robust users of applied science such as the Department of Defense. And no central scientific organization can meet the present crisis without being able to influence the whole spectrum of science from basic research to engineering development.

At the other extreme, some crass realists who measure research only by the size of appropriations would turn the whole task of coordinating science over to the Department of Defense. Most of the money does go into military research, and the most determined efforts at the coordination of science since 1947 have come inside the defense structure. Yet it is just the close inter-relatedness of military research to that carried on in the other parts of the Government, in industry, in the universities, and in the private foundations which makes the whole problem of the coordination of science so difficult. The health of military research is profoundly dependent on the health of science in the whole society. Hence any official within the Department of Defense either will be able to reach only one segment of the spectrum of research, or he must launch on the disastrous policy of applying military control to all the scientific institutions of the country.

The shortcomings of these alternative solutions only heighten the importance of Dr. Killian's appointment. He is the man in the only spot in the country where real hope exists for creating a central scientific organization. His journey to Washington must not be merely to chair another advisory committee meeting. The appointment, as a renewal of a long search for an adequate institution for science, may mark the beginning of a new and desperately needed arm of the United States Government. Or Dr. Killian may, like Karl Compton before him, return to Cambridge in a couple of years a sadder and wiser man.

The main advantage of the Office of the President as the place to begin this new effort lies in the President's position clearly above all the agencies, both public

and private, which together make up the total scientific establishment of the Nation. Many of the Government research agencies are under one or another of the departments, especially Defense, Agriculture, Interior, and Health, Education, and Welfare. Still others report to the President alone—the Atomic Energy Commission, the National Science Foundation, the National Advisory Committee for Aeronautics. With the proliferation of research contracts and Federal grants, the Government's action has profound effects on the universities, the foundations, and industrial research. Conversely a supremely important problem area such as missiles research can be influenced only by actions for transcending the program itself. Corporations, universities, and a wide scattering of Government agencies must come together to solve it. Only a power very near the summit of the Federal structure can hope for success. The priceless advantage Dr. Killian possesses is his position near the President. If he is to make the most of this boon, he must be guided by certain principles, and he must act quickly.

First, he must begin immediately to work for a formal place in the Executive Office of the President, clearly defined by an act of Congress and supported by funds earmarked for it in the budget. The vague title of special assistant is clearly not good enough to insure Dr. Killian the power he needs or to insure the prompt appointment of a successor. The Council of Economic Advisers sets a precedent for a comparable scientific organization.

Second, Dr. Killian must develop some kind of partnership with Congress. Standing committees on science and technology are almost a necessity. A serious aspect of the current crisis is that the issues are so complex that Congressmen can only nibble at them. They can scrutinize the travel accounts of scientists but find it difficult to have an opinion on a billion-dollar program. In this atmosphere a strong lead and a continuous program of scientific education for Congressmen would pay big dividends.

Third, Dr. Killian must have a secure line of communication to the Nation's scientists. He must be able to find out what is going on in their separate fields; at the same time he must persuade them to act in the common good even when the interests of their own specialties might dictate otherwise. To do this, he will need a whole series of advisory committees divided along the lines of the scientific disciplines. These committees should preferably be small rather than large. The more comprehensive networks of the National Research Council and the National Science Foundation obviate the need for an unwieldy group. The members should serve part time rather than full time, for the essence of their value would be their first-hand knowledge of the research and the men in their fields. They should be the influential leaders who could speak for their brethren on major policies. They should resist the temptation to waste their collective wisdom on worthy but minor matters which are easier to deal with than basic decisions.

Dr. Killian might profit in setting up his committees from an unhappy experience of Karl Compton's with the Science Advisory Board. The social sciences were given no part in that experiment, and part of its failure to win a permanent place in the Government stemmed from the awareness of that lack by several people in the Roosevelt administration. It is now even less possible than it was in the 1930's to draw a line between the natural sciences and social sciences which would not leave out vitally important research programs. Also, Dr. Killian's most severe problems will involve people and their institutions rather than electrons and protons. He stands to gain more in direct help concerning the problems facing his new organization from the social scientists than from the physicists, chemists, and biologists he is trying to coordinate. Many natural scientists are not aware of the stark simplicity of their social and political judgments.

The fourth major need for Dr. Killian is to find a way to shape the great interests who support and use science both in and out of the Government. It would be a fatal mistake to try to administer the Government agencies directly or to control the private ones. But he must deflect their individual courses just enough to make the total scientific effort of the country pull together. Within the office of the President Dr. Killian will have close at hand perhaps the only agency capable of such overall sculpturing. The Bureau of the Budget has the central position and the power of the purse. If it regularly incorporated Dr. Killian's advice it could shape not only the research of the Government's agencies, but also through requests for grants and contracts all the supporters of research in the Nation.

Whatever success Dr. Killian can achieve in his budget advice will depend largely on the quality of the information he has available. His advisory committees will provide but a part of the data. He must also have a staff which will not only supplement that data but provide information of an entirely different kind. It should be able to weigh the effects of any policy on the institutions

involved, not merely on the individual scientists. Hence, the staff should be organized along lines that represent the major users and supporters of research—defense, atomic energy, nonmilitary government research, industry, the universities, and the foundations. This staff should be manned by full-time people who have the special combination of skill needed for the analysis of institutional problems as well as for the understanding of science.

Failure to establish his position in any of these four directions will spell doom for Dr. Killian's effort at central scientific organization. The demands on him are severe, and since none of his predecessors have ever met the challenge, the chances are all against him. But the stakes are so high now that success—either of this effort or of one very much like it—is a basic need of the government and the Nation.

The real challenge which Dr. Killian must meet concerns the nature of democracy itself. Can the huge powers and huge responsibilities of science be harnessed and directed by a democracy in the interest of human freedom? A democratic government must preserve its own traditional values. At the same time it can only preserve itself by the effectiveness of its search into nature and the conversion of knowledge into physical power. It is not enough that freedom and science are compatible. Through the cold and heat of Washington, the hectic pressure of Government service, the inevitable misunderstandings about subjects at the very farthest edge of human comprehension, the fateful import of the challenge to Dr. Killian will remain clear. Democracy has a threefold task. It must be true to itself even if science seems almost too complex to be amenable to popular control. It must effectively organize science, because the military power necessary for survival depends on it. To accomplish this second goal democracy must also achieve yet a third one—to be true to the values of science as one of the major traditions of western culture. Unless science is guarded as a living stream, it cannot fulfill its role.

Senator HUMPHREY. Dr. Waterman, you are our first witness. I welcome you on behalf of the subcommittee and thank you very much for your fine cooperation in the preparation of the material requested. We are exceedingly grateful to you.

Dr. WATERMAN. You are very welcome.

Senator HUMPHREY. Is Dr. Adkinson also present?

Dr. ADKINSON. Yes, sir.

Senator HUMPHREY. We are glad to have you, Doctor.

Will you proceed?

STATEMENT OF DR. ALAN T. WATERMAN, DIRECTOR, NATIONAL SCIENCE FOUNDATION; ACCOMPANIED BY DR. BURTON W. ADKINSON, HEAD, OFFICE OF SCIENTIFIC INFORMATION [2]

Dr. WATERMAN. As you just remarked, Senator Humphrey, I have with me Dr. Adkinson who is head of our Office of Scientific Information. He will be prepared to answer questions on any of the details of our program and the general problem.

Mr. Chairman and members of the subcommittee, I appreciate this opportunity to present the National Science Foundation's views on scientific information problems in the United States.

What I shall say here is a summary of a more detailed statement, which, if the subcommittee approves, I wish to submit for the record. My testimony will be divided into three parts. First, a brief description of the present United States situation, with regard to the publication and dissemination of scientific information. Second, a summarized description of some programs in this field now being carried on within and supported by the Federal Government. And finally, a proposed program for improving the scientific information services.

[2] See additional testimony of Dr. Adkinson on pp. 407, 411, 416.

Statements will be made during this presentation of the proposed program which I believe will indicate to the committee the Foundation's attitude toward other proposals for a national program for scientific information

First, with respect to the present situation. Prior to World War II, the publication and library facilities in the United States concerned with dissemination of scientific information were able to keep up with the production of such information by the country's research organizations. During and since the war, because of the vastly greater funds poured into scientific research and the greater activity there, this situation has changed.

The flood of information coming out of the research programs has swamped the conventional facilities for publishing and disseminating technical knowledge.

Senator HUMPHREY. Doctor, are you reading from the statement we have here?

Dr. WATERMAN. This is marked "Summary Statement," the one I am reading from, and is briefer than the full draft.

Senator HUMPHREY. I want to understand this: You would like to have the full draft made a part of the record?

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. As well as any other supplementary statements that you may have?

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. Very good. Thank you very much. I wasn't able to follow, for the moment.

Dr. WATERMAN. Do you have a copy of the summary statement? It is marked "Summary Statement."

Senator HUMPHREY. I have one now.

Dr. WATERMAN. A flood of information coming out of the research programs has swamped the conventional facilities for publishing and disseminating technical knowledge and has brought demands for speedier and more efficient research finding, for better scientific research knowledge, and for better bibliographic services.

May I add a brief statement as to the way in which a scientist or a concern involving research and development handles these matters and the way they view it. Traditionally the scientist, you see, if he is a basic research scientist particularly, is out to discover something original. It must be original or his reputation suffers. He makes his reputation by the originality and soundness of his research. If it is to be original he must know what is going on. Because if he should come out with a published research article which was duplicating in an unfortunate way what was going on somewhere else, his reputation suffers. So it is very important to him personally and his reputation depends on doing original work in that sense.

Quite obviously a person in applied research, if he is interested in securing a patent, has got to know what is in the field, too. What I am trying to say is that the individuals concerned with research must have contact with work in their own field and bordering fields.

Ordinarily these individuals know how to do this. They have learned, as graduate students, and as research individuals. They work through the publications which they know in their own field and through their friends and other people throughout the world who are working in the same field.

With the great volume, however, which has been accumulated, of research findings, and more particularly with the great volume of Government reports that don't necessarily get in the regular literature and industrial research reports which again don't necessarily get into the conventional literature; that is what constitutes the researcher's problem.

The point of view of an office or of a department which is engaged in research and development is somewhat different. They like to have on hand material which any of their staff may use. That is a little more comprehensive order, you see. So they need a broader supply of working library and material from which to provide research findings to any of their staff that may want them.

Of course, it goes without saying that in addition to the problem of finding what you want and getting what you want in research, is the matter of not getting what you don't want. And that is one of the problems. It is very easy to swamp a person with papers and material, most of which he is not interested in, and does not want to have to pore through. The problem is a rather personal one, in any case, between the individual and the field of research, or between the agency and the field of research.

Let me cite several examples of current difficulties in the scientific information field. In spite of considerable expansion of existing scientific journals and the initiation of many new ones, publication facilities have not kept pace with the production of research results. Also the size that has been achieved in this period of rising printing and publications costs has overtaxed most journals' financial resources. As a result editors are forced to reject many worthwhile papers, and excessively condense others while backlogs of unpublished manuscripts continue to pile up.

Library facilities also are becoming increasingly overburdened. Financial limitations prevent research libraries even from searching all the publication lists they should, let alone acquiring, cataloging, storing, and servicing the materials they should select from these lists.

The following figures illustrate the magnitude of the growth of scientific literature in the periodical field. A world list of scientific and technical periodicals published in 1924 contained 24,000 titles. By 1952, this total had risen to 50,000, and it is estimated that by 1979 it will reach 100,000.

Scientific abstracting and indexing services will be similarly affected. For example, since 1907, Chemical Abstracts—one of the largest publications in abstracts—has listed 20 million entries in its indexes. Forty percent of these, however, have come within the last decade of this 50-year period. Even so, statements made last December by 14 major scientific abstracting and indexing services indicated that the almost half a million abstracts they compositely are issuing annually constitute only about 55 percent of what they would consider adequate coverage.

With the vastly greater quantities of scientific information to be processed and controlled——

Senator HUMPHREY. Dr. Waterman, at that point, you said "14 different abstracting companies"?

Dr. WATERMAN. Yes, abstracting and indexing services.

Senator HUMPHREY. They indicated last December that they were able to list and abstract only about 55 percent?

Dr. WATERMAN. Of what they regarded as good coverage.

Senator HUMPHREY. Do you have the list of those 14 services?

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. Could we have that for the record?

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. And any statement that the services might have made at that time.

Dr. WATERMAN. I will do that later.

Senator HUMPHREY. The reason I ask that you furnish that information is that we had some witnesses prior to your testimony who had indicated, it seemed to me, that all was well in the abstracting services. At least that was the general impression that I received. I want to make sure that I understand your point and that I am able to get the citation that you refer to.

(The material referred to follows:)

NATIONAL SCIENCE FOUNDATION,
Washington, D. C., June 27, 1958.

Mr. WALTER L. REYNOLDS,
Staff Director, Senate Government Operations Committee,
Senate Office Building, Washington, D. C.

DEAR MR. REYNOLDS: In Dr. Adkinson's absence I am forwarding to you two copies of some notes on current coverage of United States abstracting and indexing services which I believe were requested during the hearings on Wednesday.

We shall be sending you shortly the information on coordinating activities (also requested during the hearings) and the outline of our translation procedures about which I talked to you this morning.

Cordially yours,

DWIGHT E. GRAY,
Acting Head, Office of Scientific Information.

NOTES ON CURRENT COVERAGE OF UNITED STATES SCIENCE ABSTRACTING AND INDEXING SERVICES

Attachment 1: Summary of replies to a "questionnaire" sent out in preparation for the Conference on United States Science Abstracting and Indexing, held in Philadelphia January 29–31, 1958.

Attachment 2: Press release on the formation at the Philadelphia conference of a National Federation of Science Abstracting and Indexing Services.

The 14 United States abstracting and indexing services which participated in the Philadelphia conference are listed in attachment 2. Prior to the meeting these agencies filled out and submitted an inquiry form which requested various kinds of information about their respective programs. Attachment 1 is a summary of the replies to this inquiry.

Among the items of information sought were (*a*) the service's 1957 coverage of scientific literature in its field and (*b*) its estimate of what its coverage should have been for scientists in the field to have been adequately served. Data on these two points are given in detail in a table on page 243 of part 1 of the hearings on S. 3126 before a subcommittee of the Senate Committee on Government Operations (May 2, 6, and 7, 1958); totals of the figures there tabulated are as follows:

	Articles covered in 1957	Potential articles, 1957	Percent covered
12 abstracting services (abstracts)	236,614	440,700	53
2 indexing services (entries)	200,775	350,000	57
Total	437,839	790,700	55

Pertinent associated information on the science abstracting and indexing situation in the United States appears in Mr. Miles Conrad's testimony, pages 237–258 of the hearings cited above.

[Attachment No. 1]

Conference on United States Abstracting and Indexing

Summary of replies to questionnaire items I and II

Name of service, basic field	Subfields	Type of service	Coverage			Desirable coverage, basis for estimate	Added cost, suggested sources
			By service	By other United States, overlap	By foreign, overlap		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Applied mechanics. Reviews. Applied mechanics.	Theoretical and experimental methods; dynamics, statics and kinematics; mechanics of solids and fluids; heat; miscellaneous material in acoustics, soil mechanics, geophysics, lubrication and marine engineering. Subfields covered with varying degrees of completeness.	Selective: Analytical papers, reviewed; experimental papers and Government reports, reviews, author abstract, or title only, depending upon importance; all likely periodicals scanned; reviews are critical.	4,000–4,500 entries/year from 700 journals; estimate this is high percent of suitable material; reasonably adequate coverage for periodicals, particularly since cooperative arrangement with Russia.[1]	Estimate 20 percent overlap with Math. Rev. on journals covered. Slight overlap with Chem. Abs. Eng. Index, Ceramic Abs., Nuclear Sci. Abs. Met. Abs., Aero. Eng. Rev. However, treatments from different viewpoints; also AMR reviews are critical. Duplication believed desirable in experiment and design papers; should be discussed re theoretical papers.	Applied mechanics covered fairly completely by foreign services. Substantial overlap between AMR and Russian mechanical journal [1] and some with Russian mathematical journal.[2] Some overlap also with other foreign journals.[3]	AMR items/year should be increased 25–50 percent; gaps shown to exist by unsolicited reviews and other evidence. AMR would welcome discussions looking toward greater cooperation with other services.[4]	About $15,000/year to cover salary of 1 added professional person and associated searching and printing costs. Some increase perhaps in industrial subscriptions; Government support.
Bibliography of Agriculture. Agriculture and related sciences.	Includes various phases of botany, agronomy, forestry, animal husbandry, veterinary medicine, agricultural engineering and economics, rural sociology, agricultural aspects of other sciences such as chemistry and physics.[5]	Index limited to signed articles in publications received by USDA library. Foreign coverage limited to language in which staff is competent or for which summaries are available in these languages.	About 100,000 titles/year; 60–75 percent of world's agricultural literature is rough estimate; some indication 65–70 percent Russian literature coverage; probably higher for Western Europe, India, Japan.	Estimated overlap with principal other United States journals is: Agric. Index, 75 percent; Cur. List of Med. Lit., very small. Chem. Abs., Biol. Abs. and Eng. Index treat agriculture only incidentally.[6]	British Commonwealth Bureau most important foreign services; much less inclusive than Bibliography.[7] Index Veterinarius just resumed publication; good chance of cooperation.[8] Important agricultural services	Approximately 150,000 titles/year would be substantially complete coverage. Figure derived from estimates of present coverage and publications known to be missed.[9]	No figures given; cost would increase at a rate greater than growth in coverage.[10] Little hope of increased appropriations for purpose; centralized indexing might help.

U. S. Government research reports.[11] Unclassified research and development conducted or contracted by Government agencies.	All subject fields in which Government agencies conduct or contract research. 20 to 25 subject categories per issue, often including: chemicals, electrical machinery, food, fuels and lubricants, machinery, metals, meteorology, personnel aptitude testing, physics, physiology, rubber and rubber products. Special section of AEC reports (see No. 11).	Abstracts (some informative, some indicative) of Government research reports plus information for ordering; title listings plus ordering information for AEC reports.	Approximately 4,800 abstracts and 3,600 title listings/year; theoretically covers all material of this type, but actually does not receive all reports within the definition of its mission.	35 percent overlap with ASTIA publication, but this duplication inherent in their responsibilities (OTS serves general public; ASTIA is not permitted to).	in Russia, Czechoslovakia, and Yugoslavia. Probably some U. S. Government reports are covered by foreign services in specific fields, but extent not known (and would not be duplication).	A clearinghouse is being established at OTS to disseminate all translations of Russian scientific and technical information originating in U. S. Government agencies or under Government contract.	
Biological Abstracts. Biology.	All of theoretical and applied biology; typical contents lists about 100 subfields from agronomy to zoology (systematic). Major sections of BA are general biology; basic medical sciences; microbiology, immunology, public health and parasitology; plant sciences; animal sciences.	Informative abstracts of journal papers; books, patents, films, new apparatus Government and experiment station reports also are covered.	About 40,000 abstracts/year; estimated to represent approximately 26 percent of total biology research articles.	Appreciable overlap with certain other United States journals, like Chem. Abs., whose primary concern is another field; in these cases, emphasis is different; e. g. some overlap of interest with substantially every science represented at this conference. Also minor overlap with a variety of specialized abs. services which cover narrow areas intensively.	Most complete. British service is Int. Abs. of Biol. Sci. which covers about 12 percent of total and is more specialized than BA. Excerpta Medica (Holland) is comprehensive of medical research; therefore, considerable, tho quantitatively unknown, overlap with medical part of BA. Russian Referativnyi Zhurnal: Biologia covers about 70 percent of total (issued 108,000 abstracts in 1957). Smaller coverage by French Bulletin Signaletique and German Berichte Uber Die Gesamte Biologie.	Estimated 85 percent coverage necessary for satisfactory reference service; beyond, law of diminishing returns sets in. Means BA should be issuing about 130,000 abstracts/year and planning for growth rate of 7,500–10,000/year. Present plans are for expansion to 80,000/year by 1966—seems to be maximum rate possible with income in sight.	For 130,000 abstracts/year, estimated total cost between $790,000 and $1,300,000/year; would require increase of $700,000/year. Perhaps some help from cooperation with other abstract services. If overlap small, scientific value from duplicate may outweigh extra cost; if large, (e. g. as between biology and chemistry), eliminating duplicate might produce considerable saving. Only outside source of substantial added support would seem to be Government.

See footnotes at end of table, p. 319.

Summary of replies to questionnaire items I and II—Continued

Name of service, basic field	Subfields	Type of service	Coverage			Desirable coverage, basis for estimate	Added cost, suggested sources
			By service	By other United States, overlap	By foreign, overlap		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chemical abstracts. Chemistry and chemical engineering.	All branches of chemistry.	Highly informative abstracts of papers and books containing new information; title-only coverage given other books; reviews and papers on chemical history and education are noted briefly.	About 100,000 abstracts/year from 7,500 journals, 2,000 books and including patents from 22 countries. Believed to come reasonably close to complete world coverage of literature of chemistry interest.	Varying degrees of overlap (mostly small) with United States journals where chemistry is not the primary interest; therefore, slant is different and some duplication not undesirable.[12]	Most extensive British overlap with CA now is service of J. App. Chem.; formerly large overlap with British Abstracts but its chemistry coverage was discontinued in 1953 with British chemists now using CA. Other corresponding services are Chemisches Zentralblatt (Germany) and Referativnyi Zhurnal, Khimiya (Russian); French Bulletin Signaletique chemistry coverage gives brief annotations only and no subject indexes.[13] [14]	No specific blocks of published chemical information known to be missed by CA; constant expansion necessary, of course, to keep up with growth of chemical field.	
Current list of medical literature. Medicine and official subjects.	Clinical and experimental medicine; pharmacy; dentistry; nursing; hospital administration, homeopathy, osteopathy, etc.	Selective coverage based on careful choice of journals for indexing; attempt broad balanced geographic and subject coverage.	50 percent of medical literature; 1,600 journals; 105,000–110,000 articles/year.[15]	QCM covers some 60,000 articles/year, 85–90 percent also covered by CLML.[16] Perhaps 10 percent medical literature covered by nonmedical journals.[17] Many small, highly specialized publications overlap,	Excerpta Medica 50,000 articles/year, 85–90 percent also covered by CLML. Others are Abs. of World Med. and International Abs. of Biol. Sci. (both British); and Japan Science Review: Medical Sciences. Extent	150,000–175,000 articles/year for satisfactory reference coverage. Estimate is based on comments by personnel and users of NML, of other libraries and of CLML; on a questionnaire survey made in United States and	Additional $50,000/year to expand CLML to desired level. Professional societies; foundations.

				CLML to varying degrees.[18]	of overlap between CLML and these not known. Most European and some South American countries issue medical abstracts.	Canada; and on the results of various other studies.	
Engineering Index. Engineering.	All of engineering as that term usually is understood.	Semiinformational annotations of selected material from all important pertinent published literature available to EI or through the engineering societies library. Articles selected on basis of informativeness, usefulness, currency, authoritativeness or other quality of value to engineering and related professions.	About 27,000 annotations/year from some 1,400 periodicals and an indefinite number of books. pamphlets, bulletins, reports, etc. Coverage of articles estimated roughly to be perhaps 15 percent of world's total engineering literature and approximately 60 percent of the available, worthwhile material.	Overlap between EI and the composite of other United States abstracting services perhaps around 65 percent, other services, for most part, are quite specialized. No one service duplicates EI in breadth of coverage. There are no cooperative arrangements in operation with any other service, United States or foreign.	Foreign language abstracts known to overlap EI but in toto probably to somewhat less extent than the overall English language services; perhaps 25–30 percent. Some question whether interservice cooperation would be feasible with present EI setup; for example, difficult to exchange products with an informational abstract service when EI annotations are tailored to card size.	While recognizing that problems of definition are involved, EI estimates 50,000 references/year would provide reasonably adequate coverage. This assumes desirability of 1 broad service in contrast to the 230 highly specialized services which now exist in field, each covering 1 small segment of engineering.	Estimate broadened service would increase present EI costs by 50 percent. At present, EI is self-supporting; industry should bear the cost of the expansion.
Aeronautical Reviews.[19] Aeronautical engineering.	[20]----------	Abstracts of articles, reports, books.	6,770 abstracts in 1957; estimate 50 to 75 percent of literature; coverage limited to material in the library of the Institute of Aeronautical Sciences.	[20]----------	[20]----------	To keep up with growth of literature, will probably publish approximately 8,000 abstracts in 1958.	

See footnotes at end of table, p. 319.

Summary of replies to questionnaire items I and II—Continued

Name of service, basic field	Subfields	Type of service	Coverage			Desirable coverage, basis for estimate	Added cost, suggestd sources
			By service	By other United States, overlap	By foreign, overlap		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mathematical Reviews. Mathematics.	All of pure mathematics; work in other fields with significant mathematical content; selection of applied mathematics.	Critical reviews of journal articles and advanced mathematical books published anywhere in world; reviews published in French, German and Italian as well as English—other languages translated into English; a few books (as texts) listed by title only.	Over 9,000 reviews/year from 1,036 journals and 300 books. Believed to approximate complete world coverage of pure mathematics. (Probably no more than 5 percent overlooked.)	About 20 percent covered by other services (especially Applied Mech. Review) but from less mathematical viewpoint; therefore consider this overlap desirable.	Approx. same service provided by Russian Referativnyi Zhurnal: Metematika & German Zentralblatt für Mathematik; active cooperation exists among all 3 services in supplying rare books and journals, some exchange of reviews.	No area of pure mathematical literature known to be overlooked; constant expansion necessary to cover growing literature (average of 1 new journal/month in 1957); might decide to expand applied mathematics coverage but this would probably increase overlaps.	Needs permanent subsidy to maintain present service; annual subsidies from Air Force for last few years cannot be continued; expect deficit to stabilize at $70,000–$75,000/year.
Meteorological abstracts and bibliography. Meteorology.	Principally meteorology, climatology, ionospheric and auroral physics; also material pertinent to weather and atmospheric studies in hydrology, glaciology, oceanography, cosmic rays, rockets, satellites, solar-terrestrial relations, and radioastronomy.	Mixture of informative and indicative abstracts and title-only entries aimed at covering all pertinent scientific and worthwhile popular literature in the world.	From 2,500 to 3,000 journals, abstracts about 6,000 articles/year; publishes approximately 5,000 of these and lists by title 2,000 more papers. Estimate 80 percent of world's pertinent literature abstracted, 70 percent covered by published abstracts, and 85 percent indexed.	Of United States journals, Biol. Abs. overlap MA&B by about 60 items/year; Chem. Abs. by 200; App. Mech. Rev. by 75; services covering Government reports only, by 500–600. Small overlap with Aero. Eng. Rev., Agric. Index, and Geol. Abs. For all but Chem. Abs., material highly selective. Some coop with Chem. Abs. in past but mostly same abstract not suitable to both.	MA&B coverage overlaps Phys. Abs. by 300 abstract/year. It is duplicated by Russian Referativnyi Zhurnal; Fizika; Geofizika and Geografiia for regular journals and eastern European books; little duplication with miscellaneous material from United States and worldwide meteorological services. Considerable common periodical coverage between MA&B and	Optimum coverage would mean approximately 8.000 papers in 1958, 9,000 in 1959, and 10.000 in 1960; 1,000/year of these could be title only. Estimate based on present coverage plus known growth of field.	Broadening service as indicated would cost an additional $40,000–$60,000/year plus about $70.000 to prepare and publish a decennial index. Government and industry would seem to be the only potential sources of support for this expansion.

Nuclear science abstracts. Atomic energy.	Aspects of physics, chemistry, biology, medicine, engineering, geology, mathematics, metallurgy, mineralogy that are pertinent to nuclear research and technology (71 broad subject categories used in selection).	Abstracts of material selected from journals; books; unclassified and declassified reports of AEC and its contractors; unpublished research reports of other Government agencies, universities, industry; foreign report literature. Unclassified reports made available through OTS (see No. 3).	About 14,000 abstracts per year.[21] Coverage of report literature estimated virtually complete; coverage of journals and books estimated at 60 percent.	Air Pollution and Pub. Health Abs. copy MA&B abstracts.	No comparablo coverage by any one other service; probably fairly complete overlap of journal coverage with composite of other services [2]; probably little overlap of report literature and translations (except ASTIA and OTS coverage of Government reports).	C. N. R. S. (France), Bulletin Signaletique (France) and Boletin (Mexico); not all issue abstracts. Cooperation probably could only take form of telling them about missed pubs., translating our abstracts might cost them as much as writing new ones.	No known comparable servlce; journal and book literature probably covered by composite of services in various subject fields; report literature (especially United States material) probably not well covered; Société Européenne de l'Engagie Atomique sends publications of its member organizations to NSA and relies on NSA for complete coverago.	30 percent increaso in journal coverage useful (not absolutely vital since subject composed of parts of subject fields covered by other services) plus expansion as literature grows; probably overall increase of 40 percent, to 14,500 abstracts of current items.[21]	No figures given. As an AEC publication, is supported entirely by Government.

See footnotes at end of table, p. 319.

Summary of replies to questionnaire items I and II—Continued

Name of service, basic field	Subfields	Type of service	Coverage			Desirable coverage, basis for estimate	Added cost, suggested sources
			By service	By other United States, overlap	By foreign, overlap		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Psychological abstracts. Psychology.	General psychology; physiological psychiatry; receptive, perceptual, response processes; complex processes and organizations; developmental psychology; social psychology; clinical psychology; behavior deviations; educational psychology; personnel psychology; industrial and other applications.	Semiinformative abstracts, principally of periodicals; books, Government publications, films, miscellaneous pamphlets also covered.	9,000–10,000 abstracts/year; 500–600 journals regularly covered—many others receive partial coverage. PA formerly believed to cover all psychological literature. No longer true since PA now operates under annual page ceiling; percent of total covered by PA almost impossible to estimate.	Cannot estimate percent overlap of PA by other services; principal others are Biol. Abs., Child Dev. Abs. and Bib., Cum. List Med. Lit., Kodak Monthly Bul., Personnel Man. Abs., Sociol. Abs. PA has mutual "lifting" agreement with Biol. Abs. with specific division of abstracting labor on some journals.	Some foreign overlap with Excerpta Medica and Ophtbalmic Literature (both in English) and L'Année Psychologique and Bulletin Signalétique. Cooperative arrangements of some kind with these would be desirable; none exists now.	Desirable coverage not given. Estimate under present coverage pattern, PA will double or triple in size during next 10 years. A careful study is proposed to establish exact proper mission of PA; then size and cost of future task can be estimated.	
Review of metal literature, ASM. Metals.	Smelting, refining, fabrication properties, applications of metals.	Comprehensive; informative abstracts of important items, indicative or titles only for rest.[23]	85–90 percent of world's metal literature; 8,200 abstracts per year.	No other United States exclusive metals service. Probably large overlap with composite coverage of small, highly-specialized United States services. Now co-op. with Crerar Metals Abstracts.[24]	Large overlap with British Metallurgical Abstracts and Abst. of Iron and Steel Inst. Services with varying overlap in France, Germany, Russia, and Italy.[25 26]	5,000–6,000 titles/year would give complete coverage for reference; twice this if include current-interest-only material.[27]	Very expensive. ASM; industry; Government; individuals.
Technical Abstracting Bulletin of ASTIA. Defense-related research.	All subject fields in which the Department of Defense supports scientific research.	Informative abstracts of all technical reports issued by DOD labs and R. & D. contractors; separate unclassified	Averages some 12,000–14,000 abstracts per year in unclassified TAB; reports not abstracted are cited by title and source. By definition covers 100 percent	Unknown degree of overlap in unclassified area with OTS; this duplication is inherent in the definition of the mission of the two	By definition, no overlap.	----------	

		and classified editions of TAB issued; available only to DOD, DOD contractors, and Government agencies.	of material it is allowed to handle; actual coverage less by whatever fraction of documents issued originators fail to submit to ASTIA.	agencies, i. e., ASTIA is not allowed to serve general public.			

[1] AMR and Referativnyi Zhurnal Makanika now exchange reviews.
[2] Referativnyi Zhurnal Mathmatika; also exchanges reviews with AMR.
[3] Polish Technical Abstracts; Hungarian Technical Abstracts; Japanese Science Reviews; Zentralblatt fur Mathematik, Mechanik und Ihre Grenzgebiete.
[4] Particularly with regard to raw material and sources, information on reviewers, and organizational problems.
[5] Botany and entomology covered completely; coverage of other sciences limited to papers with agricultural applications and implications.
[6] Bibliography and Agricultural Index serve different groups; also bibliography intended specifically to serve USDA and its widely scattered employees.
[7] For example, in 1956 British Forestry Abstract, 2,423 references; Forestry Section of Bibliography, 7,081 references.
[8] Note that cooperation among indexing services is less rewarding than that among abstracting services since in the latter case abstracts can be exchanged.
[9] These include publications not indexed because (1) no one can read them, (2) not received, (3) received more than 6 months late.
[10] Cost of indexing is greater for foreign than for United States publications.
[11] Issued by Office of Technical Services, Department of Commerce.
[12] For example, Gas Abstracts, Ceramic Abstracts, Biological Abstracts, abstracts in J. Am. Leather Chemists' Association.
[13] Much to be said for complete abstracting coverage of a major branch of science by one service as being preferable to fragmentation among many journals either of limited scope or having secondary rather than primary interest in the field.
[14] CA now cooperates with some other abstracting services by joint use of a single abstractor to cover journals of mutual interest; usually he prepares two abstracts although occasionally a single one can be used.
[15] Estimates of total world output vary from 200,000 (NML) to 300,000 (Welch ML).
[16] QCM semiannual volumes running 2-2½ years late; efforts underway to reduce CLML–QCML overlap.
[17] For example: Biological Abstracts, Chemical Abstracts, Psychological Abstracts.
[18] For example: Pharmaceutica; house organs, and specialty association journals.
[19] Appears as a section of the monthly journal, Aeronautical Engineering Review, published by the Institute of Aeronautical Sciences, Inc.
[20] A complete statement has not yet been received from this service.
[21] In 1957, published 10,612 regular abstracts of current items and 3,430 older reports from a special classification review project (total of 14,042).
[22] One of the principal reasons NSA was started was to provide AEC scientists with a single source of references pertinent to nuclear research.
[23] This basis of coverage begins with 1958; previously service has been comprehensive with all abstracts indicative.
[24] Duplication in narrow areas not undesirable—simplifies searching for the specialist.
[25] Negotiations now under way to obtain British and Italian metals abstracts; former are particularly important.
[26] Note that development of ASM–SLA metals classification system has promoted cooperation; it is now used by the Italian Association of Metallurgy and 1 German society and the French and German Iron Institutes probably will adopt it.
[27] More important than greater quantity would be improved quality in abstracting, indexing and tailoring service to individual needs.

[Attachment No. 2]

[Issued by Biological Abstracts, Philadelphia, Pa., for immediate release. January 31, 1958]

National Federation of Science Abstracting and Indexing Services Formed

A National Federation of Science Abstracting and Indexing Services has been formed by representatives of the larger United States services at a 3-day meeting in Philadelphia that ended today. The new Federation will endeavor through cooperative measures, education and research to improve the abstracting, indexing, and analysis of scientific information so that such information will be more readily available to all scientists and technologists in this country and throughout the English-speaking world.

The conference, which was organized by Biological Abstracts and supported by the National Science Foundation, was attended by 34 representatives of the following 14 abstracting and indexing services:

Applied Mechanics Reviews
Bibliography of Agriculture
Bibliography of Technical Reports (Office of Technical Services, Department of Commerce)
Biological Abstracts
Chemical Abstracts
Current List of Medical Literature
Engineering Index
International Aeronautical Abstracts
Mathematical Reviews
Meteorological Abstracts
Nuclear Science Abstracts
Psychological Abstracts
Review of Metal Literature
Technical Abstract Bulletin (Armed Services Technical Information Agency)

In addition, 11 representatives of the following organizations, which are concerned with the problems of science abstracting and indexing, were present:

American Association for the Advancement of Science
American Geological Institute
American Geophysical Union
National Science Foundation
UNESCO
United States Joint Publications Research Service

The opening session of the conference was addressed by Dr. Detlev W. Bronk, president of the Rockefeller Institute and President of the National Academy of Sciences. He commented that this conference provided an example of American institutions working at their best, the participants having come together in an informal way to see how by cooperation they could improve their services and work together toward common goals. He deplored the growing tendency to believe that large and difficult tasks should be relegated to the Federal Government. The great strength of the American Nation has been the sense of responsibility on the part of individuals, private organizations and local communities. Because the conference was being held with the support of the National Science Foundation, Dr. Bronk, who is also Chairman of the National Science Board of the Foundation, emphasized that one of the principles of the Foundation is to assist science through existing agencies and institutions and to help to make them more effective.

In the area of scientific information services, Dr. Bronk said that he does not think it necessary to create a large national scientific information center just because the Soviet Union has such a center. We should set our own goals and objectives and choose the methods we believe best for our purposes.

Although science and technology foster growth and change, Dr. Bronk admitted that scientists do not always welcome change. He expressed the hope that we can recognize the problems of the present and modify many of our traditional procedures to satisfy better our present and future requirements. It is possible, for example, that there are other, more efficient ways of storing and retrieving scientific information than in the form of books and journals. We now have high-speed computers that extend the powers of the human mind. The utilization of such devices in the realm of information processing, however, requires adaptability on the part of the users.

If we are to forge ahead in science, as Dr. Bronk believes we must and will, the task of abstracting and indexing scientific information will become even greater. The problem of dealing effectively with the great and rapidly growing body of scientific knowledge is one of the gravest facing science today. Some who have recognized the problem have said that we cannot afford to deal with it; but, he insisted, we can and must pay the bill to do whatever needs to be done to make scientific knowledge more available and useful if scientists are not to be submerged and overwhelmed by the sheer volume of it.

The stated objective of the newly formed Federation is to improve the documentation (abstracting, indexing, and analyzing) of the scientific and technological literature of the world in such a manner as to make it readily available to all scientists and technologists: (a) By encouraging the development of abstracting and indexing for those specialized subject fields not at present covered by such services and the further development of existing services; (b) by seeking greater uniformity in such matters as journal citations and abbreviations, and transliteration of foreign language titles; (c) by cooperation, education, research, and the pursuit of mutually useful enterprises, to strive for the best possible research information services for science and technology in the United States and abroad.

Each of the abstracting and indexing services represented at the conference will name a representative to a temporary council to serve until the new Federation is formally organized, at which time other eligible abstracting and indexing services will be invited to join the Federation. An interim executive committee of three will act for the temporary council in taking the necessary steps leading to the formal organization and incorporation of the Federation. The members of the executive committee are G. Miles Conrad of Biological Abstracts, Chairman; Dale B. Baker of Chemical Abstracts; and John C. Green of the Office of Technical Services, Department of Commerce. Funds for setting up a secretariat of the Federation will be contributed on a voluntary basis by services represented at the conference as an expression of their interest in the development of the new organization. It is expected that grants and donations will help to maintain and to expand the activities of the Federation.

During the conference, the participants discussed a number of problem areas which will be given continuing attention by the new Federation. Among the matters discussed were the possibility of establishing standards in form, classification, abbreviations, and transliteration that could be adopted by the member services; improved means of learning about new scientific publications; cooperative methods for insuring optimum coverage of scientific literature by the abstracting and indexing services of the United States; ways and means to provide user access to the primary publications abstracted and/or indexed by the various services; the need for research and studies directed toward better indexing techniques that would help all the services to improve the quality of their indexes and the speed with which they are issued; the development and adaptation of the new methods and equipment for printing, particularly for printing indexes and bibliographic listings, more economically and more promptly and the development and evaluation of new types of services for users.

Dr. WATERMAN. Our abstracting services are doing excellent work. It is a matter of keeping up with the volume.

With the vastly greater quantities of scientific information to be processed and controlled, and the accompanying increase in complexity of systems, conventional techniques for storing and treating data have become inadequate. Yet existing machine techniques still are too inefficient and costly for use with other than small bodies of specialized information in well-defined search situations.

Up to now no organization has possessed the responsibility and the funds to permit it to provide really effective national leadership in this field, although the National Science Foundation has attempted to do so to the extent of its limited resources right from the beginning of its establishment.

At present, the Foundation is actively engaged in recruiting a staff and developing a program to meet this need for an organization that, on a nationwide basis, will be able to identify and analyze the strengths and weaknesses in existing practices and then to take aggressive

action, both to develop solutions and to take preventive measures against unforeseen future problems. Necessary legal authorization for such a program already exists. It is in our act.

Therefore, we see no necessity for the passage of S. 3126.

With regard to Federal activities, traditionally the Federal Government has taken a vital interest in scientific information and, as its role in supporting research has become more and more important, this interest has expanded. Let me document this statement by simply mentioning very quickly, and without elaboration, a number of specific examples of the Government's participation in scientific information activities.

Such participation is of two kinds: Direct operation of information programs or services, and support in various ways of non-Government projects.

Among the former are the following:

1. The technical bulletins which the Department of Agriculture has issued for decades.

2. Bulletins and technical reports issued in considerable quantities by the Bureau of Mines, the Geological Survey, the National Advisory Committee for Aeronautics, the Atomic Energy Commission, the Department of Defense, and others.

3. Such abstracting and indexing services as the Current List of Medical Literature, Nuclear Science Abstracts, and the Bibliography of Agriculture.

4. The world's greatest research library, the Library of Congress, and such other outstanding institutions of this kind as the National Medical Library and the Department of Agriculture Library.

5. Scientific translation programs of a number of Federal branches, particularly the intelligence agencies.

6. Research programs in scientific information being carried on by the Patent Office, the National Bureau of Standards, and the intelligence agencies.

7. Information dissemination programs like those of the Office of Technical Services in the Department of Commerce, and the Government Research Information Clearinghouse in the National Science Foundation.

As examples of specific programs of support by Government agencies of scientific information activities not directly operated by the Government, we have:

First, the establishment of privately administered depositories of their technical publications by the Atomic Energy Commission, the National Advisory Committee for Aeronautics, the Army Map Service, and other agencies.

Second, acquisition by the Midwest Inter-Library Center of all journals covered by Chemical Abstracts and Biological Abstracts. This is supported by the National Science Foundation.

Third, issuance of cover-to-cover translations of some 36 leading Russian scientific journals. This is supported by the National Institutes of Health and by the National Science Foundation, with assistance from the Atomic Energy Commission and the Office of Naval Research.

Fourth, extensive research on scientific information problems of various kinds, financed by contracts or supported by the National Science Foundation, the Air Force, the Office of Naval Research, and others.

Senator HUMPHREY. Dr. Waterman, I hope you don't mind these interruptions?

Dr. WATERMAN. No, indeed.

Senator HUMPHREY. As we go along I should like to have you develop a point or two.

What is the time lag with reference to translations under the heading "Issuance of Cover-to-Cover Translations of Some 36 Leading Russian Scientific Journals"?

Dr. WATERMAN. Can you answer that, Dr. Adkinson?

Dr. ADKINSON. The time lag on the translations for the cover-to-cover journal is running 4 months or better, at the present time. We are striving for 4 months' deadline. We haven't made it yet although some of the journals are coming close to it. Some of them are running as far as a year or more behind.

Senator HUMPHREY. In abstracting and translations, a 3 to 4 months' period is not unusual, is it?

Dr. ADKINSON. No. I was speaking only of the cover-to-cover translations of journals. I wasn't speaking of abstracting or indexing.

Senator HUMPHREY. I understand. Cover-to-cover is much more exacting and time consuming.

Dr. ADKINSON. That is correct.

Senator HUMPHREY. Would it be fair to say that in many of these publications you are running about a year behind?

Dr. ADKINSON. More than a year in the cover-to-cover translations.

Senator HUMPHREY. Is there any reason to believe that if you were given a better staff that—when I say "better" I mean quantitatively, as I am sure your staff qualitatively is very good—if you had more staff would you be able to process these journals better?

Dr. ADKINSON. At the present time we make grants to professional organizations and universities to do this job, and they work with commercial organizations who have their own translators.

Senator HUMPHREY. What about stepping up that program?

Dr. ADKINSON. This is a problem of just getting organized so that they can do the job. It isn't a case of finances at the present time on any one of these.

Senator HUMPHREY. It is a job of organization?

Dr. ADKINSON. It is a job of organization and getting it so that they can do it more rapidly. They are improving both in speed and in quality at the present time. But they haven't reached that 4-month deadline they are striving for.

Senator SMITH. Mr. Chairman, what is required to bring about that organization? You have legislation, I understand, Dr. Waterman. You have the authority, and you have the money and the people available; you need the organization?

Dr. ADKINSON. When I used the word "organization" I was thinking of experience and working out the details of working with the translators. We have to remember that many of these translators are not on-the-job translators who work full time at this. They are people who have experience in the subject field that is being translated. But they have another job at which they work as a professional scientist or engineer. They do this translating because they have the language competence, and they do this as a service. Then there are some professional translators. But it is difficult to get people to work full time translating who have the subject competence in science or engi-

neering because they want to keep their hands in their work. There are some, but the professional groups find that they prefer to use the part time because they get better quality. This is what they report to us.

I am reporting to you what we have gotten because we work through these professional organizations. We couldn't possibly have staff enough to review the quality of translations in all fields. It is better to let the scientific and engineering societies do this through the universities.

Dr. WATERMAN. The problem of organization is to find where the people are and to enlist them to aid in doing it. A university professor may have a good knowledge of Russian and he may be very good in chemistry, but he doesn't want to leave his job to join a center purely for translation purposes. He is doing research and teaching. But he is willing to do some translations. The problem is to find these and see that they are attached to some organization where they can be used.

Senator SMITH. How can that be better expedited?

Dr. WATERMAN. By finding out who they are and arranging for their time. The organization would be in the hands then of the agency which is concerned with that subject.

Senator SMITH. What prevents them from doing that now with the authority and the money that you have?

Dr. WATERMAN. We are doing all we can. It is a matter of finding the individuals and making sure of their services, and seeing to it that they are assigned journals or articles to translate. It is just a matter of working it out.

Dr. ADKINSON. I might explain. For instance, the American Institute of Physics is doing some of the physics journals. The lag was quite a few months. They are improving because of their procedures. They have the translators and the procedures worked out and they are very close to this 4 months' time. In other words, it takes experience to refine the techniques to get the translators, get them trained and their staff trained, and to get this published. This is the problem.

It isn't a case of money. It is a case of experience on how to get these journals out rapidly and work with a number of translators located in different places.

Senator SMITH. What I am trying to determine in my own mind is whether it is lack of available experienced translators, or what is bogging it down.

Dr. ADKINSON. It has been, early in the game, finding the experienced translators, or finding people with experience in the subject field who have language, and who could translate, to get those into a working group to produce one journal.

There is not a lack of translators. It is a lack of getting them and getting them worked into a team. As you know, in developing anything, in publishing or in any other business, you have to get your translators, your editors, your printers, and everything all coordinated. This takes time. It is coming along and we feel it will improve year after year. But it will take some more time before we hit this 4-month deadline, and some organizations may not be able to make this.

Senator SMITH. Then it is time rather than anything else?

Dr. ADKINSON. Time and experience. We have a number of letters from professors in universities, or in industrial and commercial concerns, saying, "I know Russian, I am working in this field, I will be glad to help out. But don't ask me to leave my job and come to be a professional translator. I will be glad to do it part time." It takes quite a lot of working out of techniques to be able to use that fellow effectively if he is in Texas and you are publishing in New York City. This is what I mean by experience in working out the techniques as we move along.

Senator SMITH. Mr. Chairman, I would ask that there be submitted for the record a list of the agencies or the places in Government that are doing anything toward coordination in translations.

Dr. ADKINSON. I didn't quite get the question.

Senator SMITH. Will you provide for the record a list of all of the offices in Government that are making any attempt at coordinating and translating material which we are discussing?

Dr. ADKINSON. I will try.

(The information requested follows:)

COORDINATION OF TRANSLATION BY GOVERNMENT AGENCIES

A clear integrated pattern of translation coordination within the Federal Government will be in effect within the next few weeks. Overall, the programs undertaken or coordinated by the National Science Foundation will assure effective coordination of translations of foreign scientific articles, periodicals, and books. The newest link within this framework is coming into being with the establishment in the Office of Technical Services of the Department of Commerce of a new technical information center. This center will maintain an up-to-date catalog of scientific and technical translations made by Government agencies and will disseminate copies of such translations to the public.

The National Science Foundation expects to continue, on an expanded scale, to to act as coordinator of programs; that is, the Foundation will make itself aware of all foreign information programs, both within and outside the Federal Government in order to help prevent duplication of effort between programs, nationally, and to identify areas in need of intensified effort. Because of Foundation activities in various international groups, and because of its close association with, for example, British Government agencies, a significant degree of coordination between governments should also be attained.

As an example of the kind of coordination which the Foundation can help effect, an agency with a need for translations of Russian metallurgy papers can learn through the Foundation of the existence of other metallurgy translation programs, can take advantage of the product of these programs and can stop its plans or modify them, as the situation indicates.

Advisory and coordinating committees, such as the Subcommittee on Russian Information of the Interdepartmental Committee for Scientific Research and Development, will be called upon by the Foundation to assist in this coordinating effort. The ICSRD subcommittee has served this function, responsible members of the Foundation Office of Scientific Information holding principal positions on the subcommittee. Planning of the new Department of Commerce Foreign Technical Information Center actively began in a five-agency task force of that subcommittee.

The new Department of Commerce activity will act as a clearinghouse of information about the actual output of translation programs. While the Foundation effort is directed at coordination of all efforts to make foreign scientific material available, the Commerce Department effort will be directed at detailed cataloging of translations themselves. To cite the illustration of metallurgy, used above, the agency interested in this subject, knowing that its present program integrates with rather than overlaps other programs, can verify through the Commerce Department whether or not a particular article or book has been translated.

Administratively, it is virtually impossible to determine on a worldwide basis every article which is undergoing translation, since translations are prepared not only in government but in industry, universities, by individuals, and by com-

mercial translating firms. It has been estimated, for example, that the Soviet Union publishes some 1,800 journals containing useful scientific or technical information. To the extent that a given agency is able to state that it will translate all articles from a given journal, Foundation coordination can help assure that other agencies do not needlessly duplicate translation of this journal. For the many journals and institute publications which cannot be systematically translated by an agency or agencies, the Department of Commerce clearinghouse will be able to provide information on the existence of a translation of a particular article.

Since the field of science and technology is very broad, and agencies' needs for translation will vary with the nature and status of their research programs, there must always be smaller coordination and clearinghouse operations working in conjunction with the Foundation and the Department of Commerce. The Foundation is able to work with such groups, while the Commerce Department will be made aware of every unclassified translation produced by these integrated programs.

The Foundation is already aware of some programs of this type and will increase its knowledge. The Department of Commerce is also aware of them and is now responsible for learning in detail of the product they can or do produce.

Senator SMITH. As a member of the Appropriations Committee I have heard from time to time that this office or that office or another office is doing all it can in this line; that the great need is a central office where all collecting and translations can be done.

You may remember that. That is what the Department of Commerce has been asking for, an office where there would be a central point for collecting foreign material.

Dr. ADKINSON. As I understand it, the Office of Technical Services is interested in getting the translations and distributing them. But this is not the journals that are being published and sold as a regular English-language version of a Soviet journal. These are the incidental articles, parts of books, abstracts, summaries of reports, or total books that have been done by agencies for their purposes or by industrial concerns for their purposes.

We should pull this all together, and have an approach to it, subject-wise, and dissemination mechanism so that we can get it out to the people who want it. This is a coordinating activity, but this has nothing to do with coordinating who translates what, other than to inform people what has been translated and what is being translated so there will not be a duplication of that effort.

We have attempted to help that out with our translation center at the John Crerar Library, but it is not complete.

Senator SMITH. There has been great misunderstanding about it and this will be a good way to clarify it for all of us.

Dr. ADKINSON. We will get that statement.

Senator SMITH. I think, before our Appropriations Committee, the testimony was that they should have one central office for collecting, translating, disseminating, and distributing that would take care of the whole picture. From the testimony this morning from you and Dr. Waterman I gather it is not true, that what you need is time to locate experienced personnel.

Dr. WATERMAN. In this phase of the operation of translating.

Senator SMITH. I think that should be clarified, because from other testimony it seems that it is all phases. What we are talking about this morning is quite a different matter, if I understand correctly.

Dr. ADKINSON. That is correct.

Senator SMITH. Will you prepare a statement that will clear this up for this record?

Dr. WATERMAN. Yes, indeed.

(The statement requested follows:)

NATIONAL SCIENCE FOUNDATION SUPPORT OF TRANSLATION

Almost without exception it has been Foundation policy to support translation by grants of funds made in response to proposals submitted by professional scientific bodies or academic institutions.

It is our opinion that active research scientists are in the best position to determine the kinds of information they need. They are also clearly in the best position to assess the scientific importance of publications and the scientific accuracy of translations. The procedure is in keeping with that followed by the Foundation in supporting research.

The Foundation works with the scientists of the country to help identify their informational problems and to help devise means for solving them. Final decisions on these matters are most properly the responsibility of the scientists themselves.

The current American Institute of Physics project provides an example of Foundation practice. The Institute and the Foundation worked together to determine that United States physicists did not have sufficient access to Soviet physics information. It further developed that physicists, whether or not they could read Russian, felt the best procedure to improve this situation would be to select the most important Soviet physics journals, to translate them completely issue by issue, and to make the translations widely available.

The Institute then chose to translate first the Soviet Journal of Experimental and Theoretical Physics. The Foundation received a proposal and awarded a grant to support this project financially. The physicists determined, on the basis of previous experience, that translations must be prepared by bilingual physicists who should be asked to translate only in those subject areas which they were actively following as physicists. Accordingly, Prof. Robert T. Beyer, Brown University—himself a physicist and competent translator—was appointed editor of the translated journal. Professor Beyer obtained the cooperation of several dozen physicists who volunteered to translate, for a nominal fee, papers of scientific interest to them.

In order to be able to control the project carefully, the Institute also procured varityping equipment and hired two girls who worked in Professor Beyer's office to prepare copy for the printer from the manuscripts forwarded to Professor Beyer by his translators. The Institute signed a contract with Edwards Bros., lithographers, to print the translated journal. The Institute itself distributed the journal to subscribers and kept the necessary subscription records, accounts, etc. Since its initiation in May 1955, certain details of this project have been modified but the essential characteristics have not changed.

After this pilot project was established and began to achieve acceptance from physicists, the Institute decided to expand the program to include translations of other journals on their original preference list. The next 5 such titles added to their program were the subjects of 3 separate proposals and grants. For each, the Institute awarded a contract to a commercial translation-publishing firm, Consultants Bureau, Inc. This firm translates and publishes the five journals under the editorial and business management of the Institute.

Several translating firms were given the opportunity to discuss these projects with the Institute before Consultants Bureau was awarded the contract. Price was not not the only criterion used by the Institute in choosing its contractor. The Institute has established a Board on Russian Translations which is responsible for quality control of the actual translations.

The Foundation is now supporting translations of 26 Russian journals. Two are produced by the Foundation grantee with the technique used by the American Institute of Physics for the Journal of Experimental and Theoretical Physics. Twenty-one are translated and published by commercial firms under contract to Foundation grantees. These firms in turn rely almost exclusively on the individual scientist-specialist to translative individual articles on a part-time basis at the scientist's own institution. Three are produced by a method which happened to suit unique circumstances and does not lend itself readily to extension.

We have made it a practice to notify grantees of the existence of commercial translators who express an interest in participating in the program. We do not believe we can attempt to dictate to our grantees their selection of contractors to assist in translation programs, nor do we believe we are in a position to assess qualitatively the abilities of the various firms whose names we know. We believe it is in keeping with the general policies under which the Foundation operates that such judgments be made by the scientists themselves.

While the support method used by the Foundation is complex, we believe it provides the best insurance that only significant information will be translated under auspices which assure that competent scientific judgment is applied to controlling the quality of the product. We also feel that this system appropriately recognizes and utilizes the capabilities of commercial translators.

Dr. WATERMAN. I believe it should be understood that in this service of translating, the quality of the translation is very important indeed. Just a person who knows a foreign language, of course, is not competent to translate science in the language. He must know the science. The organizations that have the incentive to do this are the scientific societies themselves, and this is where the scientists turn in the first instance for advice. So that any agency that is to coordinate this should be one that has close contacts with the scientific and engineering societies in order that they can lend their weight, which is quite important, to this job, and be of assistance in finding the people who could be brought into it. It is that scientific side which is most important.

Dr. ADKINSON. I would like to clarify one thing, also, if I left a misimpression. You say this is complicated and you can misunderstand.

There are many agencies within the Federal Government—military intelligence and other agencies—which need to translate materials for their specific work; these may be parts of articles or total articles or parts of books. They are doing this. The important thing is that we know who is translating what, so that we don't duplicate, and that these translations become available so other people within the Government and outside the Government can use them.

I don't hold a position that you can do all the translating in one organization. The agency that needs the translation frequently is the one that should get it done, either within its own organization or by hiring a specialized-subject translator to do the job they want. It can't be centralized. It is going to be spread. The centralization is the knowledge of who is doing what, and dissemination of the incidental translations.

Senator SMITH. Thank you very much. That is the first time that I have heard it so clearly expressed.

Senator HUMPHREY. I directed a letter to Dr. Waterman on May 28, and the subsequent reply was June 20, concerning the proposed establishment of a Federal center for the improvement of scientific and technical information services, private and governmental. The suggestion was made following earlier hearings that a Board of Scientific Documentation, similar to the Airways Modernization Board might be established.[3]

Senator HUMPHREY. As I understand it, what you are testifying to, is not that the Government agencies should do the translating as such, under one central bureau, but to have the agencies that have a particular field of interest or responsibility get the translating done. After that the next task is to make this information readily available to all interested parties, both public and private.

That is what we have been trying to develop at these hearings—whether there should be some coordinating body that might be able to take on this responsibility.

[3] See letter from Senator Humphrey to Dr. Waterman dated May 28, 1958, p. 302.

I think your point of stressing the importance of securing translation by utilizing persons who are acquainted with the specific scientific field is very important. The public in general feels that all you have to do is go out and hire people who can read Russian, but that does not mean that they have any knowledge at all of the professional field in which that language requirement may be needed. It is one thing to be able to speak English and another thing to be able to translate something from a document relating to atomic science. The words have a little different meaning than the ones you use at the corner drugstore.

Dr. WATERMAN. This language problem exists even within English.

Senator HUMPHREY. Go right ahead.

Dr. WATERMAN. Fifth, data and information centers like the Office of Critical Tables in the National Academy of Sciences (established with NSF support), and Bio-Sciences Information Exchange (supported by a number of agencies which sponsor biological research).

Sixth, a clearinghouse in the John Crerar Library for translations of foreign scientific documents. This library is supported by the National Institutes of Health and the National Science Foundation.

In addition to these specific programs, most Federal agencies which conduct and sponsor research have recognized their responsibility for the generation of much of today's flood of scientific information, and have supported various procedures employed by scientific professional societies to increase journal income.

Now as to proposals for the improvement of United States scientific and technical information services.

Let me preface the specific proposals I am about to present to you with a very short summary statement of the nature of the problem as I see it. I believe the problem we face in this area has two principal aspects; first, improvement of present information services which use known and tested techniques and, second, development of new and more powerful techniques which will enable us to cope successfully with the rapidly expanding body of scientific and technical literature.

The cost of a program to solve this problem will not be small. Funds must come from a number of sources just as they have in the past; that is, from Government, industry, private and public research agencies, and professional organizations. The total cost is impossible to estimate reliably but the committee should be aware that considerable increase in Federal support will be necessary if the Government is to continue its traditional share of such costs.

As I mentioned previously, the National Science Foundation already is taking steps to assume national leadership in the scientific and technical information services carried on both within and outside of Government. We believe its basic responsibilities in this connection will include principally:

1. Monitoring and assessing scientific information activities throughout the world and acting as an information center with regard to such activities.

2. Initiating or stimulating studies that will identify problems requiring attention.

3. Fostering cooperation and coordination among both Federal agencies and non-Federal organizations engaged in activities in this field.

4. Identifying inadequate services and initiating action to improve them.

5. Identifying gaps in service and taking steps to fill them.

6. Assuming leadership among agencies and organizations in the furtherance of activities leading to an adequate national scientific and technical information service.

I wish to stress, however, that in assuming these responsibilities, the Foundation sees itself primarily as an information and coordinating center; it will not perform scientific information functions or conduct operations that can be or are being carried on by other Federal or by non-Federal organizations.

As I have said earlier, and as Dr. Adkinson has said, the plan is to build on the very excellent work which is going on, to see to it that everyone knows where it is going on, and that there is good coordination between them.

As I have already indicated, NSF for several years has been carrying on work in a number of phases of an information program of the kind proposed. Limitations in funds and personnel, however, have kept this activity on a relatively low scale. To initiate development of an expanded program we already have requested, and have been granted, double the funds for fiscal year 1958 that were available in fiscal year 1957. Still larger amounts have been approved for fiscal year 1959.

I should like now to expand a little——

Senator HUMPHREY. You don't want to leave out that, "if these prove inadequate, we shall seek additional money," do you?

Dr. WATERMAN. Yes—that need not be said, I would expect that we would.

Senator HUMPHREY. I always feel that a man ought to strike a blow when he can.

Dr. WATERMAN. Perhaps that goes without saying.

Senator HUMPHREY. We have one member of the Appropriations Committee here, Senator Smith.

Dr. WATERMAN. I should like now to expand a little the very brief descriptive statement I made above of the nature of the proposed activity, and to mention several specific areas in which work will be carried on. These remarks are intended to be illustrative only and not to represent a comprehensive or exhaustive description of the anticipated program.

First, research on machine techniques, which is very appropriate to this field but a very complicated and difficult one. Progress is being made.

I mention this area first because it is the one which offers the greatest promise of solving our scientific information problems on a long-range, perhaps permanent, basis. The others concern procedures for alleviating difficulties using present procedures and conventional techniques; in the area of machine research lies the hope for new and revolutionary approaches that should produce real and lasting solutions.

Activities proposed in the general field of research on machine techniques include studies of the requirements of scientists for improved information services; design and development of improved storage-and-retrieval systems; mechanical translation research; and potentially related research in linguistics, logic, psychology, and information theory. The chief problem of course is to know how to classify, store, and retrieve the material which is required to be accessible.

In seeing to it that these tasks are carried out, the Foundation will play largely a cooperative and coordinating role, with other operating organizations providing grant support where necessary. Within NSF, there will be established a clearinghouse on current and proposed research and development activities in information processing. The Foundation also will sponsor a consulting service whereby a staff of experts will be available for advice on the use of machines in particular information situations. Periodic reviews and evaluation of progress will be made and conferences on information research will be sponsored.

This is a subject in which industry has a great interest, and we are in close touch with them and the work they are doing, as well as academic institutions.

Senator HUMPHREY. Are you familiar with the work of Western Reserve University?

Dr. Waterman. Yes, indeed.

Senator HUMPHREY. Have you worked with them?

Dr. WATERMAN. Yes. Dr. Adkinson knows them well.

Senator HUMPHREY. There was a conference held under the auspices of the university sometime last February, relating to the improvement of informational services and techniques of dissemination and translation, et cetera.

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. Did you participate in that?

Dr. ADKINSON. I did.

Senator HUMPHREY. Do you think that what you are describing here as the role of the National Science Foundation in this area of coordinating research activities or research literature is within the scope of the plans that were developed at that February conference?

Dr. ADKINSON. I think that it follows along the same general line; yes, sir. I think we are both going toward the same end. There may be a difference in techniques, but I think that our general goal and the general plan are similar.

Senator HUMPHREY. This is a very complicated field for a layman, and yet some of us who are just laymen have some responsibilities in the decision-making process as to what will ultimately happen. Are you saying, Dr. Waterman, that the National Science Foundation, under existing authority, as provided by the statute, can do this job of coordinating this vast array of research—of scientific and technological translations, dissemination, retrieving, and all that goes in this whole area?

Dr. WATERMAN. Yes, sir. What we would have in mind is providing information centers so that people can be informed where they should go, and also see to it that the agencies that have these services available know themselves what each other is doing. And we would hope in the process to identify any gaps that may exist, or prevent any unnecessary duplication in the whole process.

We would expect to take the lead in this, but not provide the services from the Foundation. That, we think, would be a mistake.

Senator HUMPHREY. Every member of the subcommittee whom I have heard express a personal opinion about this agrees that the Government itself should not overemphasize the actual translation, printing, et cetera, aspects of this work. But we should get it done through Chemical Abstracts, Biological Abstracts, and through the American Institute of Physics, et cetera, these technical professional

associations and groups, at least that they should be doing the bulk of the work. But somebody has to know where all this important information is stored. That is the whole idea.

Dr. WATERMAN. That is it.

Senator HUMPHREY. And somebody has to keep riding herd to make sure that we are not 2 years behind or a year behind. Is that what you envision your goal to be?

Dr. WATERMAN. That's right, sir.

Dr. ADKINSON. Mr. Chairman, I have here two small efforts in this field that I would like to show the committee, and submit as exhibits, if you don't mind?

Senator HUMPHREY. I hope that you have had a chance, Dr. Adkinson and Dr. Waterman, to study the testimony before this subcommittee of some 7 weeks ago when we had other witnesses here who were discussing with us the possible establishment of a new kind of an advisory board or institute of documentation. I am not for establishing one single new bureau or agency we do not need. I think we have about 10,000 too many already. If we could get an existing office to do what ought to be done, that would be all the better. It always seemed to me that the National Science Foundation had a unique role to perform in this whole area of scientific and technical data, and somehow or other it sort of got away from you.

I shall be exceedingly candid and frank. It may be our fault in Congress because maybe we did not provide you with the adequate resources to do the job. But without assessing blame, it just seems to me that all at once the problem went whizzing by and no one grabbed hold of it. Now someone is trying to catch up with it, to get a hammerlock on it and hold it still for a while until we can decide what to do about it.

Is that what you feel is the role of the National Science Foundation?

Dr. WATERMAN. Yes, sir. We have had experience in the Foundation with the problem so that we see it clearly. And I think we can handle it.

Senator HUMPHREY. We will make these two booklets a part of the record by reference.[4]

Senator SMITH. Mr. Chairman, I have a question of Dr. Waterman.

Do you think that during this period which the chairman has been talking about that there has developed much overlapping and duplicating in this effort?

Dr. WATERMAN. I would say probably that the chief problem is lack of knowledge of what is going on on the part of the people who need it, rather than duplication among the agencies doing the work.

What would you say to that?

Dr. ADKINSON. Yes.

Senator SMITH. Does the Library of Congress do anything in the direction in which you are working?

Dr. WATERMAN. The Library of Congress has been very helpful. They get material from all over the world, their bibliography lists, and so on, are what is needed to provide a stable foundation to this whole thing.

[4] The publications entitled "Current Research and Development in Scientific Documentation," No. 2, NSF–58–20, April 1, 1958, and "Nonconventional Technical Information Systems in Current Use," NSF, January 1958, were retained in the files of the subcommittee.

Senator SMITH. Wouldn't that be a good place to start as a clearinghouse?

Dr. WATERMAN. I believe they should be very much a part of this program. But it seems to me that the part which would be appropriate to them would be the library part of accessions from all parts of the world, making sure that they have the scientific information, that it is properly classified, stored, and cataloged; and then the bibliography can be produced so as to show what is available from them which can be used.

I question the extent to which they would want to get into translations of technical literature and abstracting, and these things which are now being done by other agencies. To the extent that these are being done by special groups I think we should make use of those instead of attempting to get the Library of Congress to do it all. That would be a pretty heavy load.

Would you speak to that, Dr. Adkinson?

Dr. ADKINSON. Yes.

I think we could say that the Library of Congress is the cornerstone of research in this field, in that it does have and is getting the collections. You can have the abstracting and indexing service, but if you don't have the documents to go to, then you are lost. And this happens frequently. A person finds a citation and can't get it. The Government agencies as well as research people throughout the country expect the Library of Congress to have the important works. They have not always been able to do so. In fact they are struggling to keep up with this problem now.

In addition, when they do have this, they can develop many specialized things that are useful not only to scientists but to scholars throughout all the fields. For instance, they have done an index to their current list of Russian accessions, not only their own but other libraries, consolidated. This is something that people use.

It is a very effective tool. They have done the cataloging which is used by other libraries, scientific and technical as well as the others. This is exemplified by the fact that they sell 23-plus million catalog cards a year.

In other words, if their work isn't well done and if they aren't aware of what is going on in the acquisitions and in the organization field, not only within the Federal Government but throughout the library world, and if they don't have the resources to acquire, catalog, organize, and do the special tools, this affects every other agency in the Government as well as every other research group, the library that depends on them for specialized help. So they are the keystone to this whole information problem. If they don't work effectively it will affect all the rest of us.

Senator SMITH. This will serve as a base for all the rest of the groups?

Dr. ADKINSON That is correct. They should be supported, I feel, very strongly. They need to get this material. They need to organize. And they have to be in a position to do some of the specialized work, and work with us. I think that they are an absolutely essential part of this whole program

Senator SMITH. Mr. Chairman, I think we should arrange to have that material so that we can find out just what they are doing and what is needed to carry on the work.

Senator HUMPHREY. The problem that Senator Smith brings up here is the problem that constantly plagues me. There are so many agencies of the Government that are doing something in this area, and all of them have an important role to perform whether that is in a limited scope or a very broad base. Because of the number of agencies, bureaus, and institutes that are involved in this whole area of assembling and distributing technological and scientific data and information, it just becomes a mass of confusion. No one seems to know exactly how these pieces should be put together.

Dr. ADKINSON. Let me explain. There is some confusion and there may be some duplication. But the Government agencies have worked very closely together in this information field and have strived to have a good cooperative program that is coordinated.

I can give you a typical example from my experience in the Library of Congress a few years ago. The Department of State was moving its library and they came to us and said, "Can we depend on you for material in this, this, and this field? If we can, we would like to transfer to you any material that we have that you don't have, and we will discard the duplicates, or make them available to you for exchange for other purposes." This was done. The Department of State reduced its library considerably. In the field of Russian literature at the present time the Library of Congress is the essential repository for other agencies of the Government. Agencies from other parts of the Government feed material to the Library of Congress. They list it and we draw from it. It is heavily used even though you have heard it is gathering dust. It has been used by other Government agencies and there has been demand from other research organizations outside.

It is the keystone. If they are not effective the other agencies have to do something, and they have. They have put millions of dollars into the Library of Congress—the executive agencies—to get an effective control of their Slavic collections and to have specialized bibliographic material.

Senator HUMPHREY. So what you would suggest as the National Science Foundation's role in this would be not to necessarily direct the activities of the Library of Congress in this field but to utilize its facilities as an existing institution of Government, a tremendous storage facility in this whole area of scientific literature. You would utilize those facilities——

Dr. WATERMAN. Absolutely.

Senator HUMPHREY. You would also have, as I sense your role, a coordinating function, a sort of a contact function between the many agencies of Government to make sure that this information was getting into central depositories and was being properly coordinated. Is that your idea of your function?

Dr. WATERMAN. That is correct.

Senator HUMPHREY. And reaching into the private areas to draw that into its proper relationship with the Government activities?

Dr. WATERMAN. That's right.

Senator HUMPHREY. Surely this job needs to be done, and I believe that my analogy is somewhat accurate; namely, that the problem all at once came rushing upon us and went whizzing by, and now we are beginning to try to catch up with the space satellites. We have this problem of obtaining and utilizing this information, and trying to give it some sense of direction. Is that what we are really seeking to do?

Dr. WATERMAN. I believe that's right; yes, sir. I believe in the development of the plan it is quite clear, in order to be sure that there is this type of cooperation, we would expect to have an interagency committee that would see to it that the coordination was maintained and the questions resolved. That would be a part of any such plan.

Senator HUMPHREY. Under whose directions?

Dr. WATERMAN. Under the Foundation's direction, if this plan goes through.

Senator HUMPHREY. Somebody has to be in charge. Everybody's business is nobody's business. Even if the person in charge is not as good as you might wish, it is better to have somebody in charge than to rely on nobody?

Dr. WATERMAN. Right.

Senator HUMPHREY. Senator Martin?

Senator MARTIN. Does this proposed legislation concentrate authority adequately in the language just discussed by Senator Humphrey?

Dr. WATERMAN. No legislation would be needed. We have authority in the Foundation now. It is a matter of setting the plan up and making sure it will be effective if we can, and carry it out.

Senator HUMPHREY. Will you proceed, Dr. Waterman?

Dr. WATERMAN. Next, with regard to the support of primary publications. Primary scientific publications include principally journals and books that report the results of original research. Also falling in the primary category are such far less commonly used mediums as cards and various microforms when these are employed for initial publication of technical material.

These are the ordinary scientific periodicals and books and monographs that have published research results. Also falling in the primary category are such far less commonly used mediums as cards and various microforms when these are employed for initial publications of technical material. Sometimes the first publication is in the form of just a note and these other mediums can be used for that, just as they can be in one part of the publication where there may be letters from the editor or some quick notice that can be given.

The principal problems in this field, some of which have been alluded to before, involve first, simple lack of reliable, comprehensive knowledge on such matters as existence and location of research journals and of publication problems in science.

Second, the unavailability in the United States of many foreign journals.

Third, the high cost of scientific publication which is preventing some papers from being published and causing drastic condensation or delay of others.

And, finally, the difficulty of publishing many specialized monographs. Here the Foundation will endeavor to see to it that complete and trustworthy information is assembled on a worldwide basis regarding the existence and whereabouts of significant scientific journals.

It also will take the lead in providing support, where warranted, for acquisition programs for foreign documents, for worthwhile primary journals which are in financial difficulties, for studies and analyses of scientific publication programs, and for encouraging and supporting cooperative projects for increasing publication efficiency.

Now, with regard to improvement of secondary publications. Secondary publications include scientific abstracts, indexes, bibliographies, title lists, reviews, and various other bibliographic works which are essential reference tools for research scientists, technical librarians, students, and all others who work with scientific literature. These publications have for years been providing excellent, and in many cases superb, service to the scientific community. Their present problems are similar to those of primary journals and, in fact, have been brought on to a considerable extent by the rapid rate of growth and expansion of these periodicals.

In attacking the secondary publication problem, the Foundation will conduct or support studies of the adequacy of existing services, identifying gaps, areas of overlap, and needs for new publications.

It will participate in the support, where needed, of important existing services and the initiation of essential new ones. Also it will see that there is established a clearinghouse of information on current operations and effectiveness of English-language abstracting and indexing services and on associated activities.

There is also the matter of unpublished research information. Although most United States scientific information is first published and disseminated in conventional journals, and then given secondary coverage by abstracting and indexing services, an appreciable quantity comes out initially in the form of graduate theses, papers presented before professional society meetings, and industrial and Government research reports.

Of this material, a significant amount either never is conventionally published or so appears only after a long delay. In this area the Foundation will try to see to it that these kinds of information become as readily available to scientists as conventionally published data. This will involve principally supporting both existing services like that of the Office of Technical Services of the Department of Commerce, which announces Government reports and makes them available, and of new ones for other unpublished data; establishing a number of report reference collections similar to the one now being built up in the Library of Congress; preparing and maintaining an up-to-date inventory of information programs in the Government; and providing counseling service to inform scientists regarding the location and nature of Government-sponsored research in any field.

With regard to scientific data and reference centers, these centers deal in general with collections and compilations of scientific data too large or too complex for book or journal dissemination to be practical. Such an activity might involve, for instance, the compilation, correlation, analysis, and organization of numerical data on the properties or characteristics of physical phenomena or of chemical compounds.

Examples are the Office of Critical Tables in the National Academy of Sciences and the Thermophysical Properties Research Center at the Carnegie Institute of Technology. The Foundation's program in this phase of scientific information will involve compiling and maintaining an up-to-date comprehensive file of foreign and domestic data centers, constantly analyzing this list to identify gaps where new programs are needed, studying the effectiveness of various operations of this type, and providing support for essential centers having financial difficulties. It also will support experimental centers which employ new techniques and will encourage international cooperation and coordination among projects of this general kind.

Now about foreign science information: Much of what I have already said about primary and secondary publications applies equally to information appearing in languages other than English. In other words, here we have all of the problems cited previously plus the additional one of language, particularly in the case of languages not generally read by scientists in this country.

To exploit such material effectively, the Foundation will support the acquisition and abstracting of foreign scientific publications, will continue and expand its program of translating Russian journals until such time as most United States scientists may read Russian, which would be the ideal thing, will initiate similar translating programs in other unfamiliar languages, will see to the establishment of centralized dissemination facilities for Government-prepared and other scientific translations, will support the preparation of various foreign language-English scientific dictionaries, which is most important, and will establish a clearinghouse activity to cooperate with the State Department's science attaché program.

Senator HUMPHREY. Can you tell me how the State Department science attaché program is getting along, since they dismantled it some years ago?

Dr. WATERMAN. It has taken a new lease on life.

Senator HUMPHREY. How many do they have working on that program?

Dr. WATERMAN. Dr. Wallace Brode is the science adviser. As you know, he has been appointed, and I believe he has a deputy, Dr. Farinholt, who is joining him. Their plans are going forward to select and place scientific attachés.

Senator HUMPHREY. As I recall, Dr. Brode was appointed about last December. What have they been doing since December? I have been following that activity for years. I think that when the Department of State cut off the science attaché program it was an uncalled-for diminution of information for our Government.

Dr. WATERMAN. As you know, the National Science Foundation has been extremely interested in doing this, too. It is a most important matter.

Senator HUMPHREY. It is just outrageous, and I want to know what is being done about it. Do you have any idea what Dr. Brode is doing about it? It doesn't take 6 months to get a program underway, to hire some science attachés.

Dr. WATERMAN. The recruiting of scientist attachés is a rather troublesome matter as is recruiting scientists anywhere. It takes a matter of months to first of all find people who are willing to go and then to see that the preparations are made. I assure you Dr. Brode is working very hard on this subject and also has worked out a program which he expects to put into effect, and this I believe is quite satisfactory. I understand that the State Department fully approves of this.

In the Foundation we are expecting to back him in any way we possibly can. Dr. Brode assures me that he would like us particularly to pay attention to the scientific information exchange in the Foundation as part of this general plan.

Senator HUMPHREY. I have the highest regard for Dr. Brode. My comments are surely not directed toward him. I think to abolish these attachés was just absolutely uncalled for; to have dismantled

an excellent scientific attaché program cannot be justified. Once having destroyed it, it takes months and even years to rebuild it. What would happen if it were a matter of urgency? How long would it take to get it done?

What worries me is that everybody had a sort of "sputnik" fever around October. I remember we were running at about 106° F. Every once in a while we would be in a state of shock, and almost had to administer some political penicillin. Then came Christmas and the spirit of brotherly love and good will set in, and we haven't done much since.

I want to know what is going on. Why were we so hot and bothered in October and November and cooled off so quickly in January, February, March, April, May, and June?

Dr. WATERMAN. I would like to emphasize that same point, Senator Humphrey. It seems to me this country should realize that we must get on with science research and development, and other activities as well. This means in support of research itself we must be in the forefront of progress and science. This means we must support our competent scientists and give them the tools that they need, the instruments that they need to do the job.

In addition, we have a very troublesome and complicated education problem to see to it that we can identify and encourage those who have aptitude to go into science and, in fact, in all fields of education, and see to it that their aptitudes are brought out, that they have their very fullest development. It seems to me that this is most important, both for the individual and for our society.

What I miss is the determination of the country to do this.

Senator HUMPHREY. I think you are so right. It is an old American habit that whenever we get a problem we go through an emotional binge about it, and after we have cleansed our wicked soul by this regurgitating of our evil, we sort of think things are jolly, but it is still the same sick old body.

We were going to have scholarships for our bright students and take on these Russians and run them out of the ball park. In the meantime, I do not know of a single scholarship program that has been passed by Congress, and I have not seen very much encouragement from down on the other end of Pennsylvania Avenue.

It seems to me that we have all gotten hold of a sleeping pill somewhere. We reached up to get a pep pill, and hit the wrong jug.

Dr. WATERMAN. It seems to me that one of the most important things we can do is to bring this home to everybody in the country, particularly parents.

Senator HUMPHREY. All 531 Members of Congress, maybe 200 people in the executive branch, and 170 million Americans are all for it. I have not found one living mortal in my travels around this country who isn't for what you are talking about. The only people who are not for it are the people who have some responsibility. They are too busy doing something else. I think it is outrageous.

Go ahead, Doctor.

Dr. WATERMAN. So much for a synopsis of the highlights in the Foundation's proposed scientific information program. To keep our plans and programs continually and realistically responsive to the information needs of the scientific community, we shall establish an advisory committee representing the interests of industry, science, and

Government. Also, we shall continue to seek the advice and counsel of competent individuals and groups both within and outside of Government.

I should like to emphasize again, Mr. Chairman, that we do have a program in the Foundation which has been dealing with many of these things, and we have accumulated over the years considerable experience and have actually provided quite a bit of money to further such things as research methods in the field of translating, abstracting, and conferences on the whole subject. So that we have quite a backlog of experience already.

This has been a very sketchy review of some of the scientific information activities now being carried on by the Federal Government and a very brief statement of the Foundation's plans for improving scientific information services.

If you care to have more information about the National Science Foundation's actual program now, Dr. Adkinson will be very glad to give you that.

I hope, however, that it has been sufficiently comprehensive to assure the members of this committee that the National Science Foundation is initiating an aggressive program that will rapidly and materially assist in improving scientific information services available to United States scientists and engineers. I understand this is in accord with the position taken by the Bureau of the Budget in its report on this legislation.

Senator HUMPHREY. Even if it was not, that would not disturb me a bit. That is just from my point of view. I find they are sometimes a bit difficult to get along with.

May I ask a question regarding this full draft statement originally presented? Do you want that made a part of the general testimony?

Dr. WATERMAN. Yes.

(The statement follows:)

UNITED STATES SCIENTIFIC AND TECHNICAL INFORMATION SERVICES

Draft of testimony to be presented before the Senate Committee on Government Reorganization in reference to the section on scientific and technical information of Senate bill 3126.

I. INTRODUCTION

Mr. Chairman and members of the committee, I appreciate this opportunity to present the National Science Foundation's views on scientific information problems in the United States. My testimony will be divided into three parts. First, I shall characterize the present situation in the United States and indicate a few reasons for the current problems. Second, I shall describe briefly some scientific and technical information activities within the Federal Government. Third, I shall propose a program for the improvement of services for scientific and technical information. During this discussion statements will be made which I believe will indicate to the committee the Foundation's attitude toward other proposals for a national scientific and technical information program.

II. PRESENT SITUATION

During the past 100 years the United States and foreign professional scientific organizations—private and public—have developed systems of publication and communication which until recently kept pace with scientific research. However, during and following World War II there has been so tremendous an expansion in research and development that a virtual flood of published material reporting this work has resulted. This growth has induced a demand that the information be produced and disseminated more speedily, be better organized and be better

summarized and indexed. As a result, the inadequacies of our present services have been emphasized.

Let me cite a few selected examples. The increased number of research papers has produced a bottleneck in publications even though existing journals have increased in size and new ones have been started. This growth in size and numbers of journals, the increase in composition and printing costs, and the urgency for greater speed have overtaxed the financial resources of these publishing organizations. To remain solvent, therefore, they have been forced to reject some worthwhile articles, to abbreviate others drastically, and to delay the publication of still others for periods up to several years, all of which can seriously hinder scientific progress.

Again, even as the publications have been swamped, the library facilities for acquiring and organizing published information also have been overtaxed. Most libraries cannot even afford to examine all of the lists of available material, let alone purchase, catalog, and store all the items they should select from those lists. The major research libraries in the United States have attempted to meet this problem by agreeing among themselves to assign to certain libraries the responsibility for acquiring essential materials in particular fields. This has only partially solved the difficulty because some materials from foreign countries are not always readily available; neither are funds adequate for their acquisition. In an attempt to help, UNESCO has called a meeting of representatives of the countries to explore the problems related to international exchange of publications and to develop procedures and agreements to overcome some of the inadequacies.

Again, the cataloging problems for such material have become so acute that libraries must attempt to develop new tools to improve their services. Their resources have been inadequate to handle the present quantity of publications and obviously cannot cope with the continuing expansion which is taking place. For example, in 1924 the first world list of scientific and technical serials showed 24,000 titles. By 1952 this number had risen to 50,000, and it is estimated that by 1979 the list will have grown to 100,000. The Joint Committee of Library Associations on a Union List of Serials estimates the cost of preparing just the science and technology portion of a proposed new union list will be about $750,000.

Further, the abstracting and indexing services have been unable to handle the flow of scientific and technical literature. A survey in 1957 of 14 indexing and abstracting services showed that an average expansion of 55 to 60 percent was needed to give adequate coverage of the world's literature. This is the case in spite of the fact that these services have been expanding significantly in recent years. Chemical Abstracts, for example, since 1907 has prepared 20 million indexing entries, of which 8 million or 40 percent, occurred in the last 10 years.

As the body of literature increases complexities are created in the arrangement of indexing and abstracting publications, while at the same time the magnitude of such keys to information overwhelms the users of these tools. Again, in the case of Chemical Abstracts, its 4th Decennial Index (for the period 1937–46) was published in 6 volumes while the 5th Decennial Index (1947–56) now being published will have 19 volumes. These data seem to indicate a lack of effective techniques for rapidly preparing essential bibliographic tools and for searching scientific literature for specific information. The present manual systems are slow and very tedious to use; yet, to the best of my knowledge, existing techniques for using machines in this field are either inefficient or too costly, except for small bodies of specialized literature with clearly defined characteristics. In addition, there are at present no economical methods for transforming these data into machine language for rapid searching.

Up to now no organization has possessed the responsibility and the funds to permit it to provide really effective national leadership in this field, although the National Science Foundation has attempted to do so to the extent of its limited resources. At present, the Foundation is actively engaged in recruiting a staff and developing a program to meet this need for an organization that, on a nationwide basis, will be able to identify and analyze the strengths and weaknesses in existing practices and then to take aggressive action both to develop solutions to present problems and to take preventive measures against foreseen future ones. Necessary legal authorization for such a program already exists. Therefore, we see no necessity for the passage of Senate bill 3126.

III. FEDERAL ACTIVITIES

Most of the groups concerned with the complex network of scientific and technical information activities in this country have taken steps of one kind or another to solve or to mitigate the problems in the present situation. These attempts

have met with varying degrees of success but, in general, the problems are far outstripping the solutions. Scientific information activities are an essential adjunct to scientific research activities and, like research, have in the United States been traditionally directed and controlled for the most part by scientists, acting through various professional organizations. The Federal Government also has traditionally taken a vital interest in scientific information, and as its role in the research activities of the country has expanded, so have its scientific information activities.

Much has been said in previous testimony regarding the scientific information activities of the Government, but I believe it will be helpful to summarize these activities at this time.

The Government has for many decades published technical bulletins in agriculture. Its scientific publications have expanded rapidly during this century as exemplified by the numerous bulletins and reports of the Bureau of Mines, Geological Survey, the National Advisory Committee for Aeronautics, the Atomic Energy Commission, and the Department of Defense. Some of the country's major abstracting and indexing services are published by Government agencies, including the Current List of Medical Literature, Nuclear Science Abstracts, The Bibliography of Agriculture, and other more specialized abstracting and indexing services.

The research libraries of the United States are an important element in providing our scientists with the information they need, and the Government maintains the greatest research library in the world, the Library of Congress. In addition, the Government maintains a number of specialized libraries in various agencies, the most outstanding being the National Library of Medicine and the Department of Agriculture Library.

A number of Federal agencies, including the intelligence agencies, translate scientific information from other languages into English. Research on information problems, including the development and application of new systems of handling information, is being undertaken in various parts of the Government as well, including the Patent Office, the National Bureau of Standards, and the intelligence agencies.

These are operating activities of the Federal Government in the field of scientific information. The Government is also very active in this field in aiding and supporting the activities of non-Government organizations and institutions. For example, most Federal agencies which support scientific research allow per-page fees which some scientific societies charge. Some, particularly the military agencies and the National Science Foundation (NSF), have given direct support to abstracting and indexing services. In addition, the NSF occasionally has granted emergency support to primary journals publishing research results to enable them to eliminate a backlog of manuscripts, to survive a financial crisis, or to solve some other temporary problem. The NSF has also aided financially in the publication of specialized bibliographies, handbooks, compendiums, and other valuable reference works that could not otherwise have been published, and has sponsored studies of publication practices or problems as well as experiments in new types of publication methods.

To help non-Government libraries in making scientific information available, such agencies as the Atomic Energy Commission, the National Advisory Committee for Aeronautics, the Army Map Service, and others have developed depositories in various libraries for the materials they issue. The Library of Congress issues catalog cards of materials received in its own collections as well as cooperative catalog cards of materials received in other libraries; millions of these cards are now sold by the Library of Congress to other libraries each year. The National Science Foundation has granted support to the Midwest Inter-Library Center to acquire all the literature listed in Chemical Abstracts which is not held by the libraries participating in the Midwest Library system, and a similar program is started for biology.

To aid in making foreign science information useful to United States scientists, the National Science Foundation, with assistance from the Atomic Energy Commission and the Office of Naval Research, supports the cover-to-cover translation of about 30 Russian journals and the National Institutes of Health supports the translation of about 6. These journals were selected, for the large part, by scientific societies as being the leading Soviet publications in their fields. More journals will be added to the list in the near future, including journals in other languages than Russian that are difficult for most United States scientists to read.

The National Science Foundation also has carried on an active program in support of research on scientific information problems, including studies of the

communication practices and information requirements of scientists, comparative investigations of different classification and indexing systems, fundamental studies of techniques for handling the original language of scientific documents in processing them for mechanized storage and retrieval systems, and a number of projects on mechanical translation. The Air Research and Development Command, the Air Force Office of Scientific Research, the Office of Naval Research, and others are also supporting related work on these problems. For the past 2 years the NSF has endeavored to compile information on all research and development activities in the field of scientific information, and has distributed its reports to all interested investigators and organizations to further coordination of effort on related problems.

Other coordinating services sponsored by the Government include the Office of Critical Tables, recently established at the National Academy of Sciences with support from the NSF, which will serve as a central clearinghouse and coordinating center for the various existing data centers in the United States which compile, organize, and issue specific types of scientific data. The Government Research Information Clearinghouse, which is a part of the NSF Office of Scientific Information, provides any scientist who requests it with information on where the various branches of Government are supporting research in a specific field and what reports may be available on it. The Office of Technical Services of the Department of Commerce issues lists and publishes a subscription journal which announces and abstracts large numbers of unclassified Government research reports, and makes copies of the original reports available. The Bio-Sciences Information Exchange, supported by a large number of Government agencies which support research in the biological sciences, makes information available on the nature and location of research in these fields. A recent conference of 14 major abstracting and indexing services which culminated in the formation of a National Federation of Science Abstracting and Indexing Services was supported by the NSF. The National Institutes of Health and the National Science Foundation jointly support, in the John Crerar Library in Chicago, a clearinghouse for translations of foreign science information.

It is clear, therefore, that the Government has participated in a major way in scientific information activities in this country; it is also obvious, however, to those involved in these activities, that a great deal more needs to be done.

IV. PROPOSALS FOR THE IMPROVEMENT OF UNITED STATES SCIENTIFIC AND TECHNICAL INFORMATION SERVICES

Let me preface the specific proposals I am about to present to you with a very short summary statement of the nature of the problem as I see it. I believe the problem we face in this area has two principal aspects: First, improvement of present information services which use known and tested techniques and, second, development of new and more powerful techniques which will enable us to cope successfully with the rapidly expanding body of scientific and technical literature.

The cost of a program to solve this problem will not be small. Funds must come from a number of sources just as they have in the past—that is, from Government, industry, private and public research agencies, and professional organizations. The total cost is impossible to estimate reliably but the committee should be aware that considerable increase in Federal support will be necessary if the Government is to continue its traditional share of such costs. As I mentioned previously, the National Science Foundation already is taking steps to assume national leadership in the scientific and technical information services carried on both within and outside of Government. We believe its basic responsibilities in this connection will include principally, (*a*) to monitor and assess both domestic and foreign scientific information activities and to act as an information center regarding these activities; (*b*) to initiate or stimulate studies that would identify problems that need attention; (*c*) to foster cooperation and coordination among Federal agencies and non-Federal organizations in programs engaged in scientific information; (*d*) to identify inadequate services and initiate action to improve them; (*e*) to identify gaps and take steps to eliminate them; and (*f*) to assume leadership among agencies and organizations in the furtherance of activities leading to an adequate national scientific and technical information service. I would like to stress, however, that in assuming these responsibilities the NSF should act as an information and coordinating center; it should not itself perform scientific information functions or conduct operations that can be done by other Federal or by non-Federal organizations.

As I outlined previously, the Foundation for several years has been carrying on certain phases of an information program of this kind. This activity has

been on a relatively small scale, however, because of limitations of funds. In order to initiate the development of the expanded program, we requested and have been granted twice the funds for fiscal year 1958 as for 1957. Still larger funds have been approved for fiscal year 1959 and we shall search for additional money for fiscal year 1959 if the present appropriation appears to be too limited. In order to clarify for the committee the Foundation's concept of its responsibility for the above program, I am suggesting the following activities only as examples of what can be done; it does not seem appropriate to take time here to outline in detail a national program for scientific and technical information services and to explain the Foundation's role in each of its many specific phases. Of the tasks that are mentioned, those that seem appropriate for performance within the Foundation are so labeled. It is assumed that all others would be carried on in cooperation with the Library of Congress and other Federal agencies or by grants to private organizations where necessary.

Storage and retrieval and mechanical translation developments and studies and other aspects requiring investigation

Activities in this area include studies of the requirements of scientists for improved information services; design and development of improved systems for storage and retrieval of information; development of systems for mechanical translation; and potentially related research in such fields as linguistics, logic, psychology, information theory, and coding theory.

The specific major tasks which need to be undertaken in this area are:

1. Establishment of a clearinghouse for information on current and proposed research and development activities in the field of information processing, including requirements for improved systems, design and testing of storage-and-retrieval and mechanical-translation systems, and related fundamental research (within NSF).

2. Provision of a consulting service, by a staff of experts, to Federal agencies on proposed research and development and on work in progress.

3. Provision of advice on the use of machines in information research and of assistance in locating available machine facilities for testing new techniques and systems.

4. Periodic review and evaluation of progress in the field as a guide to future research.

5. Encouragement and support of conferences and cooperative activities to facilitate the progress of research and the development of information-processing systems.

6. Stimulation and support of additional research and of tests and evaluation of new techniques and systems.

Support of primary publications

Primary scientific publications include principally journals and books that report the results of original research. Also falling in the primary category are such far less commonly used mediums as cards and various microforms when these are employed for initial publication of technical material.

The principal difficulties with respect to primary publications may be summarized as follows: Lack of adequate guides to the existence and location of current research journals; unavailability of many foreign journals in the United States; lack of precise knowledge about publication problems in the various fields of science; high cost of scientific publication and the consequent need for better production processes and other measures that will help to solve the financial problems; delays in publication of research papers, which can be eliminated in many cases only by financial assistance to reduce backlogs, expand existing journals, start new journals, or experiment with new and faster types of publication; and the impossibility of publishing many specialized monographs without financial assistance.

To alleviate this situation, the following tasks should be undertaken:

1. Collection and maintenance of information about existing primary publications, including the preparation and periodic publication of needed guides and lists:

   (*a*) Worldwide list of primary scientific research publications, subject classified and indexed.

   (*b*) Up-to-date union list showing location of primary publications listed in (*a*).

2. Support for acquisition programs for foreign or rare journals, monographs, and so forth, and for associated depository centers offering copying and loan facilities.

3. Continuing studies of current operations of research publications, including such matters as publication time lags, costs, sources of income, production techniques, editorial policies, coverage of research fields, growth, trends, and plans for the future (within NSF).

4. Support for publication where needed, including:

(*a*) Emergency aid to periodical publications in financial difficulties or with large backlogs.

(*b*) Expansion of existing periodicals where necessary.

(*c*) Aid in establishing new periodicals where needed.

(*d*) Aid in publishing significant monographs or other single-issue works that could not be published otherwise.

5. Support of studies and experiments in such areas as new types of publications (for example, high-speed services), improved production methods for publications, reader needs and use of publications, and so forth.

6. Encouragement and support of cooperative projects among publishing organizations, to increase efficiency, improve service, or decrease costs (such as establishment of standards in terminology, citations, abbreviations, and so forth); combination of production, distribution, or other facilities; conferences to facilitate joint approach to common problems.

Improvement of secondary publications

Secondary publications include abstracts, indexes, and bibliographies both in periodical and single-issue form; title lists or collected tables of contents; critical reviews synthesizing recent developments; compendiums, compilations, and other reference works. Other forms of publication which extract, index, digest, or synthesize information from primary publications would also be included in this phase of the program.

These publications are essential reference tools for scientists, as well as for librarians, students, and all others who work with the scientific literature. The fact that such a large proportion of them are issued by scientific societies illustrates the scientist's need for and dependence upon them. These publications have for years been providing excellent and, in many cases, superb service in the scientific community. As the mass of primary publication increases, the role ofthe secondary publications becomes ever more important to enable the scientist to find information he needs and to make it possible for him to keep informed about developments in his own and related fields. However, not only are the secondary publications faced with the same problems of increased volume and rising costs as are primary scientific publications, but in addition their problems become more complex as they endeavor to cover properly a larger volume of primary material. For example, the more abstracts and abstracting journal publishes the more elaborate its indexes must become; the more complete coverage such a journal attains, the more difficult are its tasks of acquisition, translation, and so forth; and the larger the mass of primary literature in a field becomes, the greater is the need for different types of secondary publications.

The tasks that should be undertaken to give United States scientists efficient and prompt access, through secondary publications, to the information they need are as follows:

1. Study of the adequacy of existing secondary publications and identification of those needing aid or improvement, of gaps in overall coverage, and of the need for new reference publications (principally within NSF).

2. Support for the maintenance and expansion or improvement of existing periodical publications.

3. Support where needed for new secondary publications, both periodicals and individual reference works.

4. Establishment of a clearinghouse for information on current operations and effectiveness of English-language abstracting and indexing services; on related scientific abstracting and indexing activities throughout the world; on new techniques and equipment that might be used by secondary publications; and on existing and contemplated reference works and reviews (partially within NSF).

5. Support of studies and experiments directed toward improving quality and effectiveness of secondary publications, such as experiments with new equipment, studies and trials of new indexing systems, and so forth.

6. Encouragement and support of conferences and of cooperative projects among the secondary publications (particularly among the abstracting and indexing services) to achieve coordination, to improve efficiency, and to facilitate the joint attack on common problems. (Examples of such activities are the establishment of standards in form, classification, abbreviation, and transliteration; and cooperative methods for insuring optimum coverage of the scientific literature.)

Unpublished research information

Most United States scientific research information is first published and disseminated within the basic framework of conventional journals and monographs and then given secondary coverage by abstracting and indexing services and by review journals and books. An appreciable quantity, however, either is never so disseminated or finds its way into conventional channels only after very long delays. The principal categories of such material are (*a*) graduate theses, (*b*) papers presented before professional society meetings, (*c*) industrial research reports, (*d*) Government research reports. This so-called unpublished material receives little or no coverage by conventional abstracting and indexing services because of its fragmentary availability and the fact that even if covered, the documents themselves might not be obtainable by users of the secondary services.

To remedy these shortcomings in the field of unpublished research results, we propose to undertake the following seven-task program which involves both some new activities and some increased emphasis on phases now under way on a limited scale.

1. Provision of announcement, abstracting, reference, and availability services on non-Government, unpublished scientific documents, including theses, society papers, and reports on university, industrial, and foundation research.
2. Provision of announcement, abstracting, reference, and availability services on unpublished reports on federally sponsored research.
3. Establishment throughout the country of a series of reference collections of unpublished research reports—particularly those on federally supported work—which would be available for consultation by anyone on the same basis as reference books and periodicals in libraries.
4. Development, maintenance, and publication of a current inventory of scientific information programs in Government agencies and of other brochures on various phases of scientific information (within NSF).
5. Provision of a counseling or reference service to which any scientist could turn for information on where the Government supports research in any given field and how access to its results can be obtained (within NSF).
6. Conduct of studies and conferences looking toward coordination of intragovernment information procedures including classification schemes, indexing methods, and the like (principally within NSF).
7. Conduct of analysis and evaluation studies of the services provided by NSF under grant, to maintain maximum effectiveness of their activities (partly within NSF).

Scientific data and reference centers

Data and reference centers are concerned with several types of activity: Compilation, correlation, standardization, and organization of numerical data representing properties or characteristics of physical phenomena or chemical compounds, and the provision of either publications or reference services in order to make these data available to the scientific community; collection, organization, and analysis of up-to-date information about research in progress and the maintenance of services that help scientists and research organizations to learn where research in particular fields is underway; and provision of literature searching and other reference services on request.

These centers and reference services supplement the abstracting and indexing journals and other published reference works. It is becoming clear that a good many more such activities are needed. It has been estimated that preparation of an up-to-date published set of international critical tables, containing all known data on physical and chemical substances, would require 100 times the work that went into the 1926–33 publication, and would be out of date long before it could be printed. It is essential, therefore, that the existing data centers, and others that will be established in fields not now covered, work constantly to maintain organized fields of data on a current basis and to provide scientists with data they need promptly and in usable form. The magnitude of such activities is evidenced by the fact that there are now a dozen or more major data-compilation operations in this country alone. Their operating costs total several hundred thousand dollars a year. Examples of such centers are the thermophysical properties research center of Purdue University and the American Petroleum Institute project at the Carnegie Institute of Technology. It is also essential that there be some overall coordination of these activities to insure that the centers usefully supplement each other's efforts.

The specific major tasks which should be accomplished in this area are:

1. Compilation and maintenance of an up-to-date reference file on all data and reference centers, both in the United States, and in foreign countries.

2. Continuing analysis of this reference file to identify gaps and recommend needed new programs.
3. Coordination of the activities of such centers in the United States, to insure that they complement and do not duplicate each other.
4. Financial support for essential centers where this is necessary either to continue existing projects or to initiate necessary new centers.
5. Studies of the effectiveness of the operation of the centers and of their products.
6. Support of experimental types of centers employing new techniques for using mechanical aids and new types of equipment.
7. Encouragement of international cooperation and coordination of data-compilation and literature-searching activities (paralleling task 3 above for national activities).

Foreign science information

Much of the preceding discussion of the problems of primary and secondary publications and scientific data centers is applicable to information appearing in languages other than English. Certain aspects of the discussion of unpublished research information also are applicable. Scientists in other countries conduct research and report their results in generally similar ways; therefore, the foreign science information problem is simply an extension of the problems discussed under primary and secondary publications.

Because of the complexity and magnitude of modern scientific communication and the amount of information dealt with, a separate program is necessary for non-English information to assure it is covered comprehensively and systematically. Unique problems arise because sources of foreign information are clearly less convenient and because impediments to easy use of this information increase greatly as the number of languages and lack of familiarity with them increase.

Varying degrees of effort are now being expended by private and Government groups on the tasks listed below. Some of these efforts are significant; some are insignificant; none is adequate.

A comprehensive program to exploit effectively foreign scientific information would include the activities outlined below:

1. Support of acquisition of foreign publications for special purposes. This activity is a part of the primary publication task.
2. Comprehensive abstracting of foreign publications. This activity is stated or implicit in the discussion of secondary publications.
3. Translation in full of significant journals and books, especially from Slavic, Oriental, and other difficult languages.
4. Support of an expanded clearinghouse of information on the availability of translations; of a translations depository; of bibliographies of translations, and of similar translation-oriented activities.
5. Support of a selective translation program to cover materials not available through tasks 3 and 4 above.
6. Establishment of a system for centralized dissemination to the public of Government-prepared translations.
7. Support of the preparation of specialized Russian-English and other foreign language-English scientific and technical dictionaries.
8. Cooperation with other agencies, where appropriate, to encourage the modification of graduate study language requirements and the improvement of foreign language instruction for science students. (NSF in consultative role.)
9. Establishment of a clearinghouse activity to cooperate with the State Department's science attaché program and where necessary to assign consultants to foreign areas to make specific studies (within NSF).

So much for a synopsis of the highlights in the Foundation's proposed scientific information program. To keep our plans and programs continually and realistically responsive to the information needs of the scientific community, we shall establish an advisory committee representing the interests of industry, science, and Government. Also, we shall continue to seek the advice and counsel of competent individuals and groups both within and outside of Government.

This has been a very sketchy review of some activities carried on in the Federal Government and a very brief statement of the Foundation's plans for improving scientific information services. I hope, however, that it assures the members of the committee that the NSF is initiating an aggressive program that will rapidly and materially assist in improving the information services for United States scientists and engineers.

Senator HUMPHREY. We also have a statement from you relating to S. 4039. That is a very brief statement. As I understand it, you fully support that proposal; is that correct?

Dr. WATERMAN. Yes, sir.

Senator HUMPHREY. You feel that it would be of assistance to you in your general program with the National Science Foundation?

Dr. WATERMAN. I believe it would be of assistance more particularly to the other Federal agencies.

I would like to add, too, that this subject of authorization to make grants, as well as contracts, has been considered by the Interdepartmental Committee on Scientific Research and Development, of which I am currently the chairman, and they are all most enthusiastic that this go forward.

As you know, the committee is made up essentially of the directors of research in all of the Government agencies dealing with research and development.

Senator HUMPHREY. So that the proposal has a broad base of support amongst those individuals and agencies concerned with scientific research?

Dr. WATERMAN. That is right, sir.

Senator MARTIN. I understand from the closing paragraph of the prepared statement that this bill, S. 4039, does not involve any additional funds.

Dr. WATERMAN. No; it is just legislative authority to have the option of making grants or contracts for research.

Senator HUMPHREY. At the present time that authority is either ambiguous or nonexistent.

Dr. WATERMAN. It does not exist in most agencies.

Senator HUMPHREY. I think this is a bill that we can take prompt committee action upon to see if we cannot get Senate and House approval.

We shall include your full statement on S. 4039 as part of the general testimony.

(The statement follows:)

STATEMENT OF ALAN T. WATERMAN, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Mr. Chairman and members of the committee, I also appreciate the opportunity to give you the Foundation's views on S. 4039, which would authorize agencies of the Federal Government, engaged in making contracts for basic scientific research at institutions of higher education or other nonprofit organizations, to make grants for support of such basic scientific research and would authorize such agencies to vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with grant or contract funds provided for the support or conduct of basic or applied research.

This legislative proposal has been presented by the Foundation in accordance with its statutory authority to encourage the pursuit of national policies for the promotion of basic research and education in the sciences. The Foundation already possesses the authority which would be provided by this bill. However, we believe that authority to use the grant mechanism and to fully dispose of property purchased with research funds provided by the Federal Government, would be of great assistance to other agencies concerned with scientific research activities. The use of the contract form is obviously in order where the agency desires to engage the services of an educational or nonprofit organization for the conduct of a specific piece of research for the agency directed toward a specific purpose. However, where an agency desires to stimulate and support fundamental research in a given field of interest to the agency, with the range of the inquiry limited only by the curiosity and creativity of the scientific investigator, use of the grant mechanism has several advantages:

1. Psychologically, it is more in keeping with the concept of maximum freedom for scientific inves igation.

2. It is not necessary to adapt hardware procurement regulations to the support of the research; and

3. Necessary advance payments can more readily be made.

The matter of title to equipment provided in connection with research activities has been a difficult one. It is our view that, at times, the national interest can best be served if the Government does not retain title to such equipment. Record-keeping and warehouse storage can be minimized and, in addition, more productive use can frequently be made of such equipment by leaving it with the educational or nonprofit institution or organization rather than having it returned to the Federal Government.

The authority granted by this bill would be permissive in nature, and it would be up to the individual agency to exercise its discretion with regard to whether it uses the grant or the contract procedure and with regard to whether it retains title to equipment purchased under the contract or grant. Greater flexibility could be attained but the Government's interest would still be well protected.

I should like to emphasize that the provisions of this bill would not authorize any new research programs or activities nor would it increase Federal expenditures in any way. In fact, in my considered judgment, it should serve to reduce the administrative paperwork incident to the support of research at colleges and universities as well as to strengthen greatly the basis of Government-university relationships in the conduct of federally sponsored research.

Thank you, Mr. Chairman. I shall be glad to answer any questions I can.

Senator HUMPHREY. Senator Martin?

Senator MARTIN. I have no questions at this time. I appreciate very much your furnishing us this important information. Your statement was needed. I am impressed with the extent of the program which S. 3126 provides. You have made some general estimates of cost. I would not ask for a specific estimate.

Dr. WATERMAN. These costs would be borne by the agencies and groups doing the actual work to a considerable extent. Did you mean our own budget?

Senator MARTIN. The Government costs.

Dr. WATERMAN. Again the Federal agencies involved in this, like the Library of Congress, and the Department of Commerce, would have their own programs which they would have to review to make sure they were adequate. I couldn't make an estimate of what their needs might be. We can, of course, for the Foundation, give a rough estimate of our responsibilities.

Senator MARTIN. The costs that we were discussing earlier today had reference to the total costs to the various agencies now engaged in this, rather than a new cost.

Dr. WATERMAN. That is right.

Senator MARTIN. That is what I had in mind, what the amount of the new cost might be.

Dr. WATERMAN. Will you speak to that Dr. Adkinson?

Dr. ADKINSON. Dr. Waterman stated something which is quite true. We want to remember that we are in this scientific information business now along with many of the Government agencies, as Senator Smith said. To estimate the total cost to the Government is a difficult job—even just to know what they are spending at the present time. I don't have those facts.

As the Senator said, there are many agencies that have scientific information activities. And these are not clearly identified in all budgets.

So I can't give you a realistic estimate of the costs at the present time. All I know is what I have learned from reviewing the activities of many of the Government agencies that are in this business. If they are to do an adequate job they must increase that activity, which means increased costs. I can't tell you whether it will be 5 million or X million dollars. But the cost will be considerably more than it is now. I am sorry I can't give you the figures, but we don't have the basis to start with, to say nothing of extrapolating from there. Each agency can give you some estimate of what is spends in this field.

Senator MARTIN. My question is not asked in a critical vein at all.

Dr. ADKINSON. I understand.

Senator MARTIN. The importance of the field should justify some additional expense in getting this job done.

Dr. ADKINSON. That is right.

Senator MARTIN. I was only trying to get a general picture of it to know better what we are dealing with.

Dr. ADKINSON. We must remember, Senator, that this business of scientific information is expanding, doubling about every 20 years, and it costs more to handle a larger body of literature than a smaller one. So you can use that as a guideline. In other words, we are going to have to double our activities every 20 years if we are going to do an adequate job. This gives some idea of the mounting cost, I think.

Senator MARTIN. There is no way to estimate how much larger the program should be made at this time. We know it must be made larger.

Dr. ADKINSON. That I cannot give you.

Dr. WATERMAN. There is another factor, of course, Senator Martin, and that is that if we can succeed in developing machine techniques to a higher degree, that ought ultimately to result in decreased costs. Although the development of such techniques and the initial cost of installing might be high, ultimately they could do the work of a great many salaried people. So we could look forward to at least one counteracting effect if we could succeed in doing that.

Senator HUMPHREY. Because of the number of witnesses this morning, I believe that we shall excuse Dr. Waterman and Dr. Adkinson.

We may want to get in touch with you again. We are very grateful to you, may I say, for your cooperation and your helpfulness, and also for the very constructive proposal that you have made here.

I am going to ask Mr. Reynolds to keep in touch with you, Dr. Adkinson, with reference to the more detailed plans that the National Science Foundation may have for serving as a sort of central coordinating agency over this whole field of scientific and technological information.

Thank you very, very much, and congratulations to the National Science Foundation for the wonderful work that you are doing, and to you, Dr. Waterman, for your outstanding service to the country. I think every one of us is indebted to you.

Dr. WATERMAN. Thank you very much, Senator.

Senator HUMPHREY. Mr. Huff will be our next witness.

STATEMENT OF BEN G. HUFF, DIRECTOR, OFFICE OF REVIEW AND SERVICES, OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE, RESEARCH AND ENGINEERING

Mr. HUFF. I should like to bring up Dr. R. E. Stegmaier, a member of my staff.

Senator HUMPHREY. Please do.

Mr. HUFF. Mr. Chairman and members of the subcommittee, I appreciate this opportunity to meet with you and to present information concerning the responsibilities of the Office of the Assistant Secretary of Defense, Research and Engineering, for technical information matters in the Department of Defense.

Since this is my first appearance before this subcommittee, I have a brief statement concerning my background and experience which may be included in the record, if you so desire, It is attached to my statement.

Senator MARTIN (presiding). That will be included as a part of your statement at this point.

BACKGROUND AND EXPERIENCE

I was born in Iowa on January 27, 1911, and educated in the public schools of Iowa and Minnesota. In 1933 I received a bachelor of arts degree with majors in business administration and English from the University of Omaha.

I have been an employee of the Federal Government continuously for 23 years, mostly with the military departments and the Secretary of Defense. For the past 10 years I have been a member of the staff of the Office of the Secretary of Defense. In 1953 I became a special assistant to Mr. Newbury, formerly the Assistant Secretary of Defense, Engineering, and with the consolidation of the offices of the Assistant Secretaries for Engineering and Research and Development, I became the Director of the Office of Review and Services.

Mr. HUFF. The Office of the Assistant Secretary of Defense, Research and Engineering, and its predecessor, the Research and Development Board, has been interested and concerned with the collection, dissemination, and use of technical information for a number of years.

In 1948, the Research and Development Board chartered a Committee on Technical Information. The principal act of this committee was to establish the Armed Services Technical Information Agency (ASTIA) in 1951 by consolidating the activities of the Navy at the Library of Congress, known as the Navy Research Section, and a similar Air Force operation at Dayton, known as the Central Air Documents Office (CADO).

The Secretary of Defense issued a directive in May 1951, establishing ASTIA to provide a central service for the collection of technical information from the three services and the dissemination of these documents to Department of Defense laboratories and defense research and development contractors. The Air Force was appointed as the executive agent to supervise and operate the agency.

ASTIA policy matters are determined by the Assistant Secretary of Defense, Research and Engineering, and in these matters I am the chief staff assistant. Originally, the operation was financed by equal contributions from the three services, but in 1955 the Air Force was directed to finance the agency as an overceiling item.

The records of congressional hearings and the popular press have many times contained both praise and criticism for the ASTIA opera-

tion. On a recent trip to the west coast, I visited the facilities of several major defense contractors who are also users of ASTIA services. On questioning they all stated that they were very well satisfied with the excellent service they have been receiving from the ASTIA organization. The effort of our office is to improve continually the services that the organization offers its users.

For many years, the agency was geographically split between the offices at the Library of Congress and Dayton. Last February these were consolidated in a single unit at Arlington Hall. Several years ago regional offices were established in New York and Los Angeles and, in 1957, in San Francisco.

These offices were established to service areas where ASTIA users were concentrated. By means of catalog and microcards most of the ASTIA documents are immediately available to local users. In connection with the move and consolidation at Arlington Hall, the ASTIA staff has been completely reorganized and has been authorized 375 personnel. In recent years, the cost of the operation has been about $2½ million per year.

As mentioned previously, ASTIA was established to service Department of Defense laboratories and research and development contractors with technical information. It was never the purpose or intent that ASTIA should be a public technical information office.

Public services are by law to be provided by the Department of Commerce through the Office of Technical Services from whom you have heard or will hear during the course of this testimony. The agencies of the Department of Defense forward unclassified documents directly to the Office of Technical Services. The Office of Technical Services announces these documents to the general public and makes them available in accordance with standard procedures.

ASTIA does provide the Office of Technical Services with copies of an unclassified bulletin so that users of the Office of Technical Services may have timely information on what reports have been prepared in the Department of Defense.

Like some other Government agencies responsible for security classified research and development documents, ASTIA has additional problems because of the special handling which must be given classified material. A survey is presently being conducted by National Science Foundation personnel of a portion of the older part of the ASTIA collection to determine if the material contains classified reports of sufficient general technical interest to warrant considering downgrading and release to the general public through the Office of Technical Services. The results of this survey will not be available for several months.

Although the ASTIA operation is restricted by limitations of security, funds, and manpower, we are continually striving to do a better job.

I should like to add there, when I say "restricted by limitations of security," I refer to the handling of classified documents. We are not able to process those as rapidly as we would like, or some other people would like us to do it, because we have to pay careful attention to security, of course.

When I speak of funds, I really have reference to the expenditure limitations that were placed on the whole Department of Defense last

year, and of course, ASTIA, like everybody else, had to take their fair share of the reduction in expenditures.

Senator MARTIN. Did that limitation have any impact on your program?

Mr. HUFF. It did not happen to have, Senator Martin, because at this time we were contemplating a move and we had to shut down the service for a short period of time anyway. As a matter of fact, we are going to be able to turn $30,000 back as a result of the operations for fiscal year 1958.

Senator MARTIN. You have had no limitation in your program due to a shortage of funds?

Mr. HUFF. No. The fund problem really goes back a few years. It is a matter of determining how much money they ought to have to do the job that was assigned to them, and there were some ups and downs in the program, and the Air Research and Development Command, really the parent agency in the Air Force, found it necessary to reduce the level of effort from time to time.

We have changed that so that ASTIA will have a certain fixed amount each fiscal year and it will be neither increased nor decreased unless there is a new assignment given to them or an overall reduction.

When I say "manpower," the problem there, and we face it right now, is getting the right people to perform some of the skilled jobs that have to be done.

It is not a matter of personnel ceiling. It is a matter of finding the right people.

Every effort is being made to improve the ASTIA service by providing ASTIA with a more complete collection of Defense research and development documents and making these available to users in the shortest possible time.

The Science and Technology Act of 1958, S. 3126, envisions a super-type of international coverage technical information service for all scientists, engineers, industrial firms, and universities of the Nation. The Department of Defense would undoubtedly have a part to play in such an effort. We currently operate and maintain the ASTIA operation which might become a part of such a Department of Science and Technology.

However, at the present time, we have a very amiable and close working relationship with both the National Science Foundation and the Office of Technical Services of the Department of Commerce, and we feel that by cooperating with these agencies, we can and are providing a service to the public.

Furthermore, we agree with the National Science Foundation that no further legislation is required to provide the American scientific community with adequate and satisfactory technical information services. We believe that the agencies presently authorized who are actively cooperating with one another can provide such services if they receive adequate support.

That concludes my statement with respect to S. 3126, Senator Martin.

Included with my statement is the Department of Defense position with respect to S. 4039. If you want me to read that, I will go ahead.

Senator MARTIN. Yes, proceed.

Mr. HUFF. With respect to the bill, S. 4039, to authorize the expenditure of funds through grants for support of scientific research and

for other purposes, the Department of Defense heartily supports this proposed legislation.

The Department of Defense believes that a more liberal attitude in authorizing grants for the support of basic research would greatly stimulate and enhance these efforts. There is no doubt that institutions of higher education and other nonprofit organizations conducting basic and applied scientific research for the Department of Defense on contract will welcome the opportunity to obtain title to the equipment purchased with contract funds.

Furthermore, as mentioned in the explanation furnished with the draft bill by Dr. Waterman, the policy as proposed in the bill would eliminate the time, labor, and expense involved in keeping records of equipment and negotiations at the time of termination of research projects.

Senator MARTIN. That is an excellent statement.

I have no questions.

Mr. HUFF. That concludes my statement. I purposely left it brief because of Dr. Waterman's testimony, which we fully support. I might say we are working closely with Dr. Waterman and his people, across the whole board on technical information. We are learning a lot about the other agencies that are involved in the same problem. I think we can do a better job as we go along.

Senator MARTIN. You have come a long way in the armed services, since I last served on that committee.

It was a real struggle for us during World War II. I visited Wright Field during that time. I was quite familiar with the program then. I have not had active service on the Armed Services Committee—I was in the House of Representatives at that time—since 1947, so I am rather out of date on what you are doing and how you are meeting this problem of coordinating your work with the National Science Foundation and other Government agencies that are active in this field.

Mr. HUFF. Of course our consolidation helps the operation quite a bit. We were at Dayton and the Library of Congress. This will help speed up our operations, I am sure. There are some other things that we can do and that we are working on now to improve the whole setup.

Senator MARTIN. Thank you very much for your statement, Mr. Huff.

The next witness is Dr. C. W. Shilling, accompanied by Mr. Bernard M. Fry.

STATEMENT OF DR. C. W. SHILLING, DEPUTY DIRECTOR, DIVISION OF BIOLOGY AND MEDICINE; ACCOMPANIED BY BERNARD M. FRY, ASSISTANT DIRECTOR FOR TECHNICAL INFORMATION SERVICE, ATOMIC ENERGY COMMISSION

Senator MARTIN. Do you have a prepared statement?

Dr. SHILLING. I do not have a prepared statement on S. 4039, but I have a few remarks.

Mr. FRY. Mr. Chairman, I am Bernard M. Fry, Assistant Director for Technical Information Service, Division of Information Service, Atomic Energy Commission. I appreciate the opportunity to present

the views of the Atomic Energy Commission on scientific information problems.

The effective dissemination of technical information within the Government atomic energy projects and among science and industry generally has been a prime concern of the Atomic Energy Commission since its establishment. Continuous, positive efforts are made to collect, publish, and disseminate all useful scientific and technical information on atomic energy developed in this country and throughout the world.

The Commission publishes its research results in more than 7,000 technical reports annually, of which 5,000 are issued without security classification and are made widely available to the scientific and industrial communities; an additional 2,000 papers generated by AEC scientists and engineers are published in the professional and technical journals each year.

To make available in useful form the rapidly increasing atomic energy literature produced in this country and abroad, an extensive system of preparing and supplying reference tools has been maintained by the Commission's Technical Information Service since 1947. Abstract journals, both classified and unclassified, covering the AEC-originated literature and that coming from other sources around the world are published biweekly. Bibliographies of subject areas are compiled and issued. State-of-the-art books, compendia of information in various fields, and review journals are published. One hundred fifty depository libraries are maintained throughout this country and abroad. All useful AEC technical reports and engineering drawings are placed on sale in full-size or microcopy form; more than 500,000 copies are sold annually to the public. A central library reference service is operated by the Technical Information Service Extension at Oak Ridge.

A description of these and other technical information services provided science and industry is set forth in a short paper entitled "Summary of Efforts of the Atomic Energy Commission To Gather and Disseminate Information to the Scientific Community," which we would like to submit for the record. This summary was prepared and transmitted by letter of February 10, 1958, responsive to a request, to Chairman Moss of the Subcommittee of Government Information, House Committee on Government Operations. A more detailed guide to the Commission's technical information services is found in the AEC brochure "What's Available in the Unclassified Atomic Energy Literature," now in its fifth revision. Copies are presented herewith for the committee's information.

Senator MARTIN. These will be made a part of the record by reference.

Mr. FRY. In addition, a 3-year—1955–57— summary of progress in supplying technical information to science and industry is contained on pages 162–171 of the 23d Semiannual Report of the United States Atomic Energy Commission, issued in January 1958. This is also available for your reference.

Senator MARTIN. This will be made a part of the record by reference.

Your "Summary of efforts of the Atomic Energy Commission to gather and disseminate information to the scientific community"

will be incorporated in the committee proceedings directly. The others will be incorporated in the record by reference.[5]

(The document referred to follows:)

SUMMARY OF EFFORTS OF THE ATOMIC ENERGY COMMISSION TO GATHER AND DISSEMINATE INFORMATION TO THE SCIENTIFIC COMMUNITY

The Atomic Energy Commission maintains an extensive and active program for gathering and disseminating information within the national atomic energy program and among science and industry generally. Continuous positive efforts are made to collect and disseminate all useful scientific and technical information on atomic energy developed in this country and abroad.

The Commission's Technical Information Service collects and reproduces domestic and foreign scientific and technical reports on atomic energy; collects and prepares translations; abstracts and indexes reports, journal articles, books, and patents on atomic energy; publishes five abstract journals; prepares and publishes books and review journals; maintains depository libraries throughout this country and abroad; provides library reference service; maintains an extensive document exchange system with domestic and foreign organizations; and distributes all AEC-generated information and translations to Commission contractors, other Government agencies, and to the scientific community as a whole. A description of technical information services provided science and industry is given in the brochures prepared and distributed by the Commission: Guide to Atomic Energy Literature for the Civilian Application Program, Government and the Atomic Industry, and What's Available in the Unclassified Atomic Energy Literature.

ACQUISITION

It is the policy of the Commission that contractors must promptly prepare formal reports on all significant technical work. In addition, the Commission's Technical Information Service has an extensive program to acquire, largely by exchanges, information of interest to atomic energy research produced by other Government agencies, universities, and private institutions throughout this country and by governments and research organizations abroad. Arrangements are in effect for automatic and selective acquisition of information produced by the Department of Defense and other Government agencies and their contractors. Private industrial concerns are encouraged to make their reports available. In return for AEC collections of unclassified reports, foreign governments are required to supply their publications on atomic energy to the United States. Approximately 550 laboratories, universities, and other research institutions, both domestic and foreign, exchange publications with the Commission. From these exchanges and from the bilateral agreements, the Commission has received, in addition to journals and reprints, over 6,000 unpublished reports. Half of these came from Great Britain, over 1,000 from Canada, and the remainder from about 25 other countries.

AEC contractors and individual scientists at the various AEC laboratories are encouraged to develop their own exchanges. Materials thus received, including those from Soviet bloc countries, are sent to the Technical Information Service for abstracting and translating where necessary.

Under the President's atoms for peace program, collections of AEC nonclassified technical reports are maintained in 68 institutions in 51 foreign countries. The recipients of these foreign depositories have agreed to send their published literature on atomic energy to the AEC.

DISSEMINATION

The Commission maintains an active program throughout its contractor activities for the preparation and dissemination of its technical reports—as nonclassified documents to the public, including science and industry generally—and as classified documents within the Government atomic energy projects. In addition, scientists and engineers are constantly urged and assisted to publish the results of their endeavors in journals of their choice. Page costs may be paid to nonprofit journals for publication of AEC papers. The total number of nonclassified technical documents generated by AEC and its contractors rose in 1957 to approxi-

[5] The publications entitled "Guide to Atomic Energy Literature" and "What's Available in the Unclassified Atomic Energy Literature" were retained in the files of the subcommittee.

mately 40,000 documents, of which about 10,000 had been published in professional or technical journals. The remainder are for sale through the Office of Technical Services, Department of Commerce, or are available at depository libraries donated by the Commission to cities and universities throughout the United States.

Newly issued Commission nonclassified reports are distributed automatically by originators of reports to those who have a need for them within the atomic energy program. Distribution is facilitated by a system of some 20 subject categories which permit a selective distribution by fields of interest in accordance with the needs of the various recipients. A similar automatic distribution system provides for the circulation of classified documents with the Commission and among its contractors, to access permit holders, and to individuals in the Department of Defense and other Government agencies who require information in the fields involved.

To insure the widest availability of Commission research literature, classified reports are reviewed for possible declassification. With the progressive declassification of information since 1954, more than 20,000 technical reports have been declassified and released to the public.

Approximately 10,000 reports remain classified in military and production categories. The Commission has also developed an access permit program to provide United States science and industry with needed categories of classified information to assist progress in nuclear technology and to develop peaceful applications of atomic energy.

In addition to widespread dissemination within the atomic energy program, copies of all AEC nonclassified technical reports are made available to the scientific community through deposit in 79 public and university libraries throughout the United States and are sold through the Office of Technical Services, Department of Commerce. Copies of AEC reports are also on sale in microcard form from the Microcard Foundation, Madison, Wis. In the past 3 years, more than 900,000 copies of AEC nonclassified reports have been purchased by the public.

Security classified reports are available on sale to authorized access permit holders through the Technical Information Service at Oak Ridge. Since 1955 approximately 50,000 classified reports have been sold to permit holders in industry and science. Libraries of classified documents are maintained in eight cities for reference use by permit holders. Both classified and nonclassified engineering drawings originating in the Commission projects and catalog cards abstracting reports are also available on sale through the Technical Information Service in Oak Ridge. The list of nonclassified engineering materials now includes sets of over 10,000 items.

ANNOUNCEMENT OF AVAILABILITY OF INFORMATION

In order to make known what information is available, the Commission abstracts and indexes all scientific and technical publications on atomic energy and prepares numerous bibliographies and other reference tools which are made publicly available. All information materials are announced in a system of five abstract journals. These journals consist of the nonclassified semimonthly Nuclear Science Abstracts, two special publications for access permit holders, the monthly Secret Reports for Civilian Applications and Confidential Reports for Civilian Applications, the semimonthly Abstracts of Classified Reports and the classified quarterly Abstracts of Weapon-Test Reports. The latter two journals cover security classified materials circulated within the Government atomic energy projects.

Nuclear Science Abstracts, issued by the Commission since its establishment, reports to the scientific community all nonclassified scientific and technical literature on atomic energy published in this country and abroad. The volume on Scientific Serials published in 1956 by the Association of College and Reference Libraries stated, "The great dependence of the nuclear scientist upon Nuclear Science Abstracts is increasing, almost to the exclusion in some projects of the use of other abstracting journals." In 1957 the European Atomic Energy Society decided not to start another abstract journal in the field. Instead they proposed to provide the AEC Technical Information Service all their publications so that comprehensive coverage would be assured. The current volume of Nuclear Science Abstracts carries about 14,000 abstracts of reports, journal articles, books, patents, and translations. It is sold on subscription through the Superintendent of Documents, Government Printing Office. More than 7,000 copies of each issue are distributed to scientists and institutions in this country and abroad.

TRANSLATION

To make the useful foreign literature on atomic energy available to United States scientists, the AEC program for technical information service has included the dissemination of reports of foreign research results as well as those developed in the national atomic energy program. From 1947 to the present, the Commission's Nuclear Science Abstracts has carried more than 14,000 abstracts of papers published abroad in nuclear science and related fields. Approximately 4,200 foreign papers, of which 3,800 are Russian, have been translated in full and are available on request from the Technical Information Service. All translations are deposited in the Special Libraries Association translations pool maintained at the John Crerar Library, Chicago (formerly the Scientific Translation Center, Library of Congress). In addition, the more important translations are put on sale through the Office of Technical Services.

Beginning in fiscal 1953, the Commission has supported, by transfer of funds, cooperative governmentwide translation programs sponsored by the National Science Foundation. In fiscal 1957, the Commission further expanded its translation program to include direct contract translation of eight large Russian monographs of AEC programmatic interest. Fifteen additional Russian monographs are being translated in this current fiscal year. The Technical Information Service also serves as a clearinghouse for approximately 350 translations annually produced directly by AEC contractors.

To assure complete coverage of useful foreign scientific literature, and to avoid duplication of translation effort, representatives of the AEC are participating in meetings with other interested Federal agencies to plan an abstracting and translation program which would greatly increase the availability of translated foreign scientific and technical information. It is understood that the National Science Foundation and the Department of Commerce have developed concrete proposals to this end.

A detailed analysis of AEC translation efforts is attached as appendix 4.[6]

PUBLISHING

In the Commission's view the publication of AEC-sponsored research in numerous technical reports and in professional and technical journals is not enough to assure effective dissemination in readily usable form to the scientific and industrial community. In order to compile and organize the information on a current basis the Commission has undertaken the following special publication programs:

(*1*) *Technical books*

To help meet the urgent need for scientific-engineering texts and handbooks, the Commission undertook in 1955 a program to compile the existing information into summary volumes surveying the main bodies of data. Six volumes were published in 1957. Manuscripts for more than 20 books were in preparation at the year's end. Most of the manuscripts are being produced under specific writing contracts; the remainder are being written as subsidiary tasks under research and development projects. The Commission is cooperating closely with the publishing industry to avoid duplication in the preparation of titles and to assure that Commission-sponsored books are made available to the scientific community through normal publishing channels.

(*2*) *Quarterly technical progress reviews*

Since published books in rapidly developing fields can hardly be kept sufficiently current to meet the needs of science and industry, the Commission undertook in 1957 to prepare and issue quarterly technical progress reviews in specific subject matter areas.

These reviews digest and evaluate the latest findings in nuclear technology and science. The first issue of Power Reactor Technology will be published in January 1958. A second issue of this review, and the first issues of Spent Fuel Processing and Solid Reactor Core Materials are scheduled for appearance early in 1958. All are available on subscription through the Superintendent of Documents, Government Printing Office.

(*3*) *Proceedings of meetings and symposiums*

An important mechanism for prompt dissemination of atomic energy information in particular fields is through papers presented at meetings and symposiums. The proceedings of conferences sponsored wholly or jointly by the Commission

[6] Revised and brought up to date as of June 24, 1958.

are published by the Technical Information Service and placed on sale at the Office of Technical Services.

(4) Industrial releases

The Commission's release system has been expanded to provide business and research management with details of present and prospective Commission policies, programs, services, and technical data which directly or indirectly affect their interests. These industrial releases are mailed to the technical and business press and to interested individuals upon request.

GUIDANCE FOR TECHNICAL INFORMATION PROGRAM

To provide continuing analyses and guidance for the Commission's technical information program, a technical information panel consisting of the senior information officers of the United States atomic energy facilities meets twice a year to review the effectiveness of the program. In addition, an Advisory Committee on Industrial Information made up of technical journal editors and representatives from industry meets periodically to advise the Commission on ways and means to increase the flow of significant information to American industry through the business and technical press.

COSTS OF THE COMMISSION'S TECHNICAL INFORMATION PROGRAM

A total of $3,106,175 has been allocated in fiscal 1958 for operation of the Commission's Technical Information Service. Of this amount, $100,000 has been apportioned to carry out translations work. This provides for the transfer of $40,000 to the National Science Foundation in support of the translation of Russian journals in nuclear science and related fields. The remaining $60,000 is being spent for direct contract translation of Russian monographs recommended by AEC laboratories and individual scientists.

The amount given for operation of the Commission's Technical Information Service does not include AEC contractors' costs in this field which may be estimated at approximately twice the Commission's costs.

Appendix 4

Steps Taken or Planned by the Atomic Energy Commission To Translate and Publish Foreign Scientific Literature

Since its beginning, the AEC program of technical information service has included the dissemination of reports of foreign research results as well as those developed in the national atomic energy program. From 1947 to the present, the Commission's semimonthly journal, Nuclear Science Abstracts, has carried more than 14,000 abstracts of papers published abroad in nuclear science and related fields. Approximately 4,200 foreign papers, of which 3,800 are Russian, have been translated in full and are available on request from the Technical Information Service. Several hundred foreign translations relating to civilian uses have been placed on sale, along with AEC unclassified reports, at the Office of Technical Services, Department of Commerce. Beginning in 1953, the Commission has supported, by transfer of funds, cooperative governmentwide translation programs sponsored by the National Science Foundation.

The Technical Information Service has served from the beginning as a central coordination point in assisting AEC contractor translation activity and avoidance of duplication of effort. The Commission has cooperated with other Government agencies, including the Department of Defense and the Central Intelligence Agency, in exchanging lists of translated materials and translations, and also the United Kingdom Atomic Energy Authority and Atomic Energy of Canada Limited. The AEC also cooperated with the Foundation in 1952 in the translation and publication of some 250 physics articles in an experimental program to broaden the base of public availability of Russian language materials. Beginning in 1954, the AEC joined with the National Science Foundation in support of a Scientific Translation Center located in the Library of Congress.

After the Geneva Conference it became apparent that these translation and publication services, extensive though they were, would not meet all needs of project scientists and engineers for knowledge of the latest Russian and other foreign advances in nuclear science. The Russians particularly were publishing more and more material in their open literature that would be of real value to the scientific effort in the United States if it could be translated and published with a minimum of delay.

First steps at broadening and improving coverage of Russian scientific literature taken after the Geneva Conference included procurement for Project Sherwood of the translation of some 200 Russian journal articles on high energy physics. Additionally, a four-volume translation was prepared of the papers presented at the scientific conference in Moscow in July 1955, Conference of the Academy of Sciences of the U. S. S. R. on the Peaceful Uses of Atomic Energy.

In fiscal 1957 the Technical Information Service undertook an expanded translations program of important Russian materials in fields of nuclear science, including coverage of both journal and monographic literature. In addition, the Commission joined with the National Science Foundation in promoting a broad program for the cover-to-cover translation of Russian scientific journals of direct AEC programmatic interest; $44,000 was transferred to the Foundation in support of the translation of the following journals: Journal of Experimental and Theoretical Physics; Journal of Technical Physics; Physics of Metals and Metallography; Proceedings of the U. S. S. R. Academy of Sciences, Physics, Chemistry, and Botany Sections (Doklady Akademii NAUK SSSR).

In addition, translations were obtained by AEC through direct contract, of 8 Russian monographs and conference proceedings, 95 journal articles, and abstracts covering 553 papers presented at 2 U. S. S. R. Academy of Sciences meetings in March and April 1957 on Radiation Chemistry and on The Application of Radioactive and Stable Isotopes in the National Economy and Science. These translations, comprising some 2,400 pages, have been given project distribution and are generally available through the Office of Technical Services and the depository libraries. In fiscal 1958 this program has been continued. There have been completed or are in process some 15 major monographs.

The monographs selected for translation were recommended under a coordinated review procedure established by an ad hoc committee of the technical information panel in March 1957. This procedure provides for the initial screening of Russian and other foreign scientific materials by staff of the Technical Information Service followed by a careful evaluation by Russian-reading project scientists who recommend for or against translation.

The translation of monographs is an attempt to fill a large gap in the present United States translation programs. Since there is no copyright protection for Russian books, commercial publishers have been extremely reluctant to undertake the translation of Russian books.

The Technical Information Service also serves as a clearinghouse for approximately 350 translations annually produced directly by AEC contractors. All translations supported by AEC funds were made available to the project and to the public generally through the Office of Technical Services; the Scientific Translations Center, Library of Congress, and the Special Libraries Association translation pool at the John Crerar Library, Chicago. Close liaison has been maintained with other translating bodies in the Government, primarily through the intelligence agencies. The AEC in addition has undertaken to provide a clearinghouse for translations in process. Lists are presently circulated on a monthly basis which announce all translations proposed and in process.

Recently, too, the AEC established exchanges will all the Western European atomic energy establishments. Not only are all translations exchanged, but the Europeans have also agreed to contribute to the information pool on translations in process.

For fiscal 1958, $100,000 has been allocated for expanding the translation program beyond the fiscal 1957 level. It is planned to support the National Science Foundation at approximately last year's level, and there is attached a letter of request for continued support from the Foundation which in addition describes the very considerable accomplishments of fiscal 1957.

NATIONAL SCIENCE FOUNDATION,
Washington, D. C., November 12, 1957.

MR. MORSE SALISBURY,
Director, Division of Information Services,
United States Atomic Energy Commission,
Washington, D. C.

DEAR MR. SALISBURY: This letter is in the nature of a progress report on what was accomplished in fiscal year 1957 through the fine cooperation of the Atomic Energy Commission and the National Science Foundation in the development and expansion of a program to translate and make available Russian research

information. It will also outline the areas in which continued cooperation of AEC and NSF in the dissemination of scientific literature will benefit the national atomic energy program and the overall national scientific effort. The matter of such continued cooperation between the AEC and NSF has been discussed in detail by Mr. Feinstein of your staff and Mr. O'Dette, NSF program director for foreign scientific information. Needless to say, we are very much pleased that AEC wishes to express its satisfaction with what has already been accomplished by again contributing a substantial sum to the Foundation program.

Conversations between Messrs. Feinstein and O'Dette have led to the conclusion that most of the funds transferred by the AEC should be devoted to translations of Soviet journals in the fields of physics, metallurgy, applied mathematics and mechanics, chemistry, chemical engineering, and possibly crystallography. This would mean continuation of translation projects to which AEC funds were applied last year, the initiation of new translation projects in fields which have hitherto been neglected, and the initiation of a special project in chemistry. Certain portions of the contemplated expansion cannot be undertaken without such funds as may be made available by AEC.

Appendix A to this letter is a partial list of NSF foreign information projects which are already underway and projects which will have been started before the end of the fiscal year. Although I feel that the entire Foundation foreign science information program is of interest and potential benefit to the AEC, the appendix lists only those projects which are particularly pertinent to the national atomic energy program. AEC funds will be devoted to such projects only.

The principal reasons for translating complete journals were presented to you by Dr. Thompson last year. An additional year of experience with this kind of program has served only to confirm the validity of the approach. And recent events have added dramatic emphasis to the need for making more Russian material accessible to our scientists.

As you know, NSF began its journal translation program in 1955 with the field of physics. In the physics translation program, income from subscriptions has continued to increase, and we feel strongly that the maximum has yet to be reached. The translation of the Journal of Experimental and Theoretical Physics now has over 800 subscribers and is still virtually self-supporting in spite of recent increases in production costs. Accordingly, AEC funds will no longer be required for the translation of this journal. The translated Journal of Accoustics will, as was stated last year, continue to be considered outside AEC interests. AEC funds in support of physics translation will, therefore, be devoted solely to the Journal of Technical Physics and to the Physics Section of the Proceedings (Doklady) of the Academy of Sciences of the U. S. S. R. These journals already have several hundred subscribers, and an intensive effort is planned for this year to make their availability more widely known among scientists in order to increase dissemination of the scientific information and to increase subscription income.

During the past fiscal year, largely with the aid of the AEC funds, a grant was made to the Board of Governors of Acta Metallurgica for translation and publication of two Soviet journals in the field of metallurgy: The Physics of Metals and Metallography and the Journal of Abstracts-Metallurgy. Translation of the former journal had been suggested by Dr. Edward Epremian, of the AEC Division of Research, and proposed by Acta Metallurgica almost simultaneously. Dr. Epremian participated in the detailed review of the journal, upon which the decision to translate was based. A portion of the funds contributed by AEC this year will be applied to continue support of the metallurgy journals, which, with the physics journals, were last year considered the projects of primary interest to the AEC.

In addition to the support of translation projects already underway in physics and metallurgy, it is proposed that AEC funds be devoted to the initiation of translation projects in other fields. More than a year ago arrangements had almost been concluded between the Foundation and Brown University for the translation of the Soviet Journal of Applied Mathematics and Mechanics, when the Soviet publishers increased the size of the journal. For administrative reasons, Brown University decided to withdraw the proposal. Since that time, our attention has been directed continually to the importance of the work the Russians are doing in applied mathematics and to the fact that the outstanding papers are published in this journal. The American Society of Mechanical Engineers has now submitted a tentative proposal to us to publish the translation. Preliminary estimates place the cost of the first year of operation at about $50,000.

Under discussion also is a translation project in chemical engineering. Analysis of the Russian serial literature in the field, both by our staff and by working chemical engineers, has identified Chemical Science and Industry and Chemical Industries as the leading chemical engineering journals and indicates that their translation would be highly desirable. Preliminary discussions between NSF and the American Institute of Chemical Engineers are now underway and we look forward to beginning the project during this fiscal year. We have estimated that translation and publication of the two journals would cost about $26,000 for the fiscal year.

The Foundation also proposes to initiate this year a project which will enable Consultants Bureau, Inc., of New York, to reduce the subscription prices on its six principal Russian journal translations in the field of chemistry. Consultants Bureau has been translating these and other journals for some years and for economic reasons has been forced to offer them at subscription rates which are beyond the reach of any but the most affluent research institutions, industries, and libraries. NSF now plans to enter into a guarantee-against-deficit arrangement with Consultants Bureau, the immediate effect of which will be a sharp reduction in the subscription rates of the journals listed below. All subscription income will be retained by Consultants Bureau, to be applied against costs, and any deficit will be made up by NSF.

	Present price	Proposed new prices	
		General subscriptions	Individuals and academic institutions
Journal of General Chemistry	$170	$100	$36
Journal of Applied Chemistry	95	60	20
Journal of Analytical Chemistry	80	24	8
Bulletin (Izvestia) of the Academy of Sciences, Division of Chemical Science	150	45	16
Doklady (four chemistry sections)	125	24	8
Colloid Journal	80	24	8

These reductions in subscription rates will immediately place the journals within the reach of the library with limited budget, smaller research laboratories, individual scientists, and others who need them. It is reasonable to assume, therefore, that whatever losses Consultants Bureau may sustain temporarily by reducing its rates will be more than made up by an increasing number of subscribers, until eventually the project becomes self-supporting. In this respect, the project will differ very little from other NSF-supported translation projects. The new projects will result in the increased availability to the scientific public of more than 9,000 pages per year of Russian chemical papers, at a relatively modest first-year cost to the Government of approximately $85,000.

If our working funds permit, the Foundation also plans to undertake translation projects in crystallography, spectroscopy, geochemistry, and other subjects where preliminary discussions and staff work have identified significant Russian information not now readily available to United States scientists.

In summary it should be pointed out that the funds which the AEC proposes to transfer to the Foundation will assist in supporting a wide range of projects in the area of Russian translation. It is our conviction that larger-scale production of Russian-journal translations should begin at this time. Our period of experimentation is over. Experience has shown that we know how to identify what needs to be translated, how to produce complete journal translations, and how to market the product. Our method of approach has proved both logical and economically justified. Hence, the machinery is already there—we need only begin. Striking evidence of the necessity for a larger-scale effort has been provided by recent headline events. AEC funds will help make such an expanded translation program possible. Supplementary service projects, such as the collection of foreign-language translations and the collection of difficult-to-obtain science journals will continue to be part of the Foundation program but will be otherwise supported.

It should also be pointed out that discussions are being held or planned with other agencies such as National Institutes of Health, Office of Naval Research, Central Intelligence Agency, and the Air Force, to enlist increased cooperation in the foreign scientific information program. Such cooperation has included transfers of approximately $35,000 plus provision of several million words of translations.

We trust that these comments provide satisfactory explanation of and justification for AEC contributions to the designated projects. If there are further questions, we should be happy to provide additional information. We are looking to a continuation of AEC support in approximately the same amount as during fiscal year 1957. The support of the AEC will, of course, be acknowledged in an appropriate manner in each project.

Sincerely yours,

T. O. JONES,
Acting Head, Office of Scientific Information.

Russian journals of interest to the national atomic energy program which are being translated

Project	*Funds, NSF*
Acta Metallurgica translation of Physics of Metals and Metallography, Abstract Journal—Metallurgy	$20,000
American Crystallographic Association translation of Crystallography	16,000
American Institute of Physics translation of Journal of Technical Physics, Doklady physics papers	40,000
American Society of Chemical Engineers translation of Chemical Science and Industry, Chemical Industries	26,000
American Society of Mechanical Engineers translation of Journal of Applied Mathematics and Mechanics	30,000
Consultants Bureau, Inc., translation of Journal of General Chemistry, Journal of Analytical Chemistry, Journal of Applied Chemistry, Bulletin of Academy of Sciences—Chemistry Division (Izvestiia), Doklady (4 chemistry sections), Colloid Journal	85,000
Total	217,000

Mr. FRY. The Commission's programs for organized distribution of technical information to science and industry expanded sharply after passage of the Atomic Energy Act of 1954.

Since 1954, the Commission has authorized two new declassification guides which together make available all essential information for civilian power reactors, and open up other wide areas of technology, at the same time that the national security is adequately safeguarded. The new guides were followed by two accelerated reviews of all useful Commission technical documents which remained classified to determine which could be released to the public, which could be given a lesser classification, and which must remain classified. As a result of these reviews, about 20,000 documents were declassified.

To make Commission-originated documents and literature from other sources throughout the world rapidly and broadly available, the Commission has instituted new technical information programs which go beyond the traditional documentation services. These have included:

1. TECHNICAL BOOK PROGRAM

In order to compile, organize, and evaluate the large volume of existing information, the Commission undertook in 1955 a program to prepare and publish summary volumes surveying the main bodies of data. Six volumes were published in 1957 and 15 are scheduled for publication during this calendar year. To help meet the urgent need for scientific engineering texts and handbooks, the Commission has steadily increased the number of arrangements for the writing and publication of summary volumes—some as part of projects under research and development contracts; others under specific writing contracts. The Commission is cooperating closely with the publishing industry in carrying out this program.

2. QUARTERLY TECHNICAL PROGRESS REVIEWS

Since published books in rapidly developing fields can hardly be kept sufficiently current to meet the need of science and industry, the Commission undertook in 1957 to prepare and issue quarterly Technical Progress Reviews in specific subject matter areas. These reviews digest and evaluate the latest findings in nuclear science and technology. To date, reviews have been issued covering Power Reactor Technology, Reactor Fuel Processing, and Reactor Core Materials. All are available on subscription through the Superintendent of Documents, Government Printing Office.

3. PROCEEDINGS OF MEETINGS AND SYMPOSIA

An important mechanism for prompt dissemination of atomic energy information in particular fields is through papers presented at meetings and symposiums. The proceedings of conferences sponsored wholly or jointly by the Commission are published by the Technical Information Service and made widely available to science and industry.

4. TECHNICAL INFORMATION WORKSHOPS

In the past year, the Commission has held three technical information workshops—at Oak Ridge, Tenn., San Francisco, and New York—to assist research and industrial organizations in utilizing to the maximum extent the rapidly expanding atomic energy literature. A similar workshop was also held last month in Geneva, Switzerland, for librarians and information officers of cooperating European and Middle East nations which have received AEC atomic energy libraries under the President's atoms for peace program.

5. LITERATURE SEARCH SERVICE

For those who wish to search the literature but do not have the facilities or personnel at hand, the Commission has arranged to provide such service, supplying on any topic either reference lists or, if it is requested, specific tabulated data. This service is sold to users at $6 per hour.

6. TECHNICAL INFORMATION EXHIBITS

Since 1956 the Commission has sponsored technical information exhibits at trade fairs and at professional society meetings to acquaint science and industry with new nuclear developments and sources of information on them.

7. TRANSLATIONS OF FOREIGN SCIENTIFIC LITERATURE

Steps taken by the Commission to enlarge its program for the translation and publication of useful foreign scientific literature or on nuclear subjects are described in a separate paper which has been submitted for the record. That is the paper provided the Moss committee.

Senator MARTIN. It has already been made a part of the record.[7]

Mr. FRY. The Commission from the beginning has been interested in the development of new techniques and systems of information

[7] See document entitled "Summary of Efforts of the Atomic Energy Commission To Gather and Disseminate Information to the Scientific Community," pp. 355-358.

analysis, storage, and retrieval. Beginning in 1949, the Commission sponsored the development of prototype equipment by RCA for flatbed facsimile transmission of research materials, tested first between AEC facilities in Oak Ridge and later in collaboration with the Library of Congress, National Institutes of Health, and the Army Medical Library. Support was also given to research and development work on the Rapid Selector carried on by the Department of Agriculture.

In 1949 the AEC developed one of the first IBM installations for the control of classified documents and later assisted various AEC laboratories in the development of similar installations. This equipment is also used for the preparation of indexes for nuclear science abstracts. Experiments were also conducted with this punchcard equipment for the storage and retrieval of technical information.

Tests were conducted at four AEC libraries on coordinated indexing and currently development work is being done on a punchcard-controlled camera for the preparation of abstract journal indexes. By providing card catalogs the AEC has also assisted in research on the utilization of closed circuit television between libraries.

In the past year the Commission has cooperated with the National Science Foundation in the development of an experimental classification and coding system for AEC documents. This experimental system, which is being developed by a company under a grant from NSF, will be tested against existing systems by which AEC documents are indexed. The ultimate purpose is to develop a coding scheme which can be utilized by a small digital computer which would be economically feasible for smaller libraries.

Since its inception, the Atomic Energy Commission has exchanged technical information on a large scale with other Government agencies, research institutions, laboratories, and universities. For example, 170,000 copies of technical reports are exchanged annually with agencies of the Department of Defense. Many fields of research carried on by other agencies are also of direct interest to AEC programs.

Accordingly, it may be appreciated that the Atomic Energy Commission has a strong and direct interest in the development of a broad program of coordination and cooperation in fields of information processing and dissemination. We feel that a cooperative effort bringing together and supplementing the combined information resources of Government, science, industry, education, and the professions would result in a more effective program for the United States. Closer coordination and cooperation is needed in several areas, including research on machine methods, increased utilization of foreign scientific information, wider availability of unpublished Government-produced research information, and the provision in several research fields of good reviews of scientific progress at frequent intervals.

We are aware of the program proposed by Dr. Waterman for the improvement of United States scientific and technical information services and we believe that the NSF program as outlined should provide a good basis for developing a national research information program which will more fully meet the needs of our scientists and engineers.

Senator MARTIN. Does that conclude your statement?

Mr. FRY. That concludes my statement.

Senator MARTIN. Thank you very much.

Dr. Shilling, we will hear you now.

Dr. SCHILLING. I have some comments on S. 4039.

I am Dr. C. W. Schilling, Deputy Director of the Division of Biology and Medicine of the Atomic Energy Commission.

As a representative of the Atomic Energy Commission, I am also happy to report our wholehearted support for S. 4039, which would authorize our agency to make grants as well as contracts for the support of basic scientific research at institutions of higher education and other nonprofit organizations.

As you are aware, the AEC now has authority under existing law to make grants for the conduct of certain educational and training activities. We are utilizing this grant authority for the granting of money to institutions of higher education for the purpose of purchasing equipment to be used for the education and training programs in the area of special interest to the Atomic Energy Commission.

To be eligible for these grants, the educational institution must meet certain prescribed requirements, which leads me to mention that a grant in our mind is not intended as an outright gift to the research institution. They would have to meet the same rigorous scientific standards now required for support by contract. But the grant is much more desirable from an administrative standpoint than a contract for support of basic research, as has been ably pointed out in the explanation of the draft bill before you and by the previous speakers.

Because of its programatic nature, much of the research sponsored by the Atomic Energy Commission would continue to be handled by contract, but we would welcome the authority to use the grant method for support of basic research, that portion of our program which we are conducting in support of our programatic needs.

We in the AEC also endorse the second section of the bill which would permit us to allow our research contractors or grantees to retain title to the scientific equipment purchased to conduct the research we are sponsoring with them.

Once again the compelling reasons for favoring this part of the bill have been clearly set forth, but let me say that such language would be very helpful to us not only in future grants or contracts but in profitably disposing of some of the equipment in university contracts now in force.

In other words, we in the Atomic Energy Commission also wholeheartedly favor S. 4039 as an instrument which would make our program of research much more efficient and would make it easier, and I think more economical, in handling our research program.

Senator MARTIN. I appreciate very much your giving us that statement, Dr. Shilling. Your field is exceedingly important to us.

I saw it born during my time on the Military Affairs Committee. I followed it very closely, although not scientifically. You have gone clear beyond anything we were then doing.

Your coordination of your work with this program is exceedingly important, in my estimation.

I do appreciate your statement and we are glad to have your views. Thank you very much.

Dr. SHILLING. Thank you, sir.

Senator MARTIN. We have one more witness, Dr. L. Quincy Mumford, Librarian of Congress.

STATEMENT OF L. QUINCY MUMFORD, LIBRARIAN OF CONGRESS

Dr. MUMFORD. Mr. Chairman, I appreciate the opportunity of appearing before this subcommittee, which is studying S. 3126, legislation proposed in the interest of improving the machinery for making the Government's contributions to the Nation's scientific research and development programs.

Since I had not expected to testify in person, I commented briefly on this bill in a letter of April 30, 1958,[8] to this subcommittee, and it has been made a part of the record.

In it I called attention to the comprehensive collections on science and technology in the Library of Congress, asserting that they constituted a national library of science. They are, of course, supplemented and complemented by the two other great national collections, those in agriculture and medicine held by the Library of the Department of Agriculture and by the National Library of Medicine.

In view of the existence of these three great collections, I viewed as duplicative and wasteful the bill's provision that the Bureau of Technical Services of the proposed Department of Science and Technology should "acquire, in cooperation with other public or private agencies, scientific literature, both from foreign and domestic sources."

I also opposed, for reasons which I need not repeat, the transfer to the proposed new department of "all functions with respect to the exchange of scientific publications being administered through the International Exchange Service" of the Smithsonian Institution, and I suggested that what we needed was not more machinery for improving the situation in regard to scientific information but strengthening that which we already have.

Today, I would like to extend my earlier remarks a bit and to explain the place of the Library of Congress in the overall science and technology picture, because, although the Library is not mentioned in this bill, we are an inseparable part of that picture.

The popular notion of the scientist—the big brain thinking in the academic equivalent of an isolation booth or brooding over the test tubes in a stainless-steel laboratory—leaves at least one indispensable element of research out of the picture; namely, scientific literature. Yet such literature is at the heart of almost any research and development project. It is essential for the scientist, whether he is working in theoretical or applied fields, not only to keep up with developments in a general way but to seek specific data, to learn where others have been so that he can see more clearly where he is going.

It was possible a century and a half ago for Thomas Jefferson, no mean scientist himself, to be quite well informed about "natural philosophy," as science was then called, by gathering together for his private library—and reading, of course—less than 100 volumes. Those days are long in the past. There has been such proliferation of scientific literature that today corporate bodies—research libraries, both highly specialized and comprehensive—must serve the scientific community.

[8] See p. 10, pt. 1, hearings May 2, 6, and 7, 1958.

The Library of Congress, as the Government's oldest and largest library, has long had special responsibilities for serving the Nation through service to Congress, to other Government agencies, and to scholarly groups in many fields.

As the statement on "The Library of Congress as the National Library of Science," [9] which has been introduced into the record of these hearings, points out, materials on science and technology constitute a very large segment of our holdings. We now have nearly 1,500,000 volumes in these fields.

In addition, we receive about 15,000 different scientific journals currently. Although we believe that we get the most important ones, the world output of such journals is estimated at 50,000 titles and they contain a total of about 2 million articles a year. Our collection of both domestic and foreign technical reports—the newest and most fugitive form of scientific literature—now numbers 300,000.

It may interest you to know that a recent analysis of the Soviet national bibliography showed that the Library of Congress received about 60 percent of the materials currently published in the U. S. S. R. in the natural sciences and about 40 percent of those published in technology.

Our comprehensive collections, important in both scope and depth, could only have resulted from years of effort and the exchange facilities enjoyed by a national library. They could quickly lose their immediate utility, however, if the Library of Congress did not constantly strive to keep them up to date. One of our major services to the Nation, therefore, is in acquiring scientific and technical materials on an ever-broadening scale and thus creating a vast reservoir from which all may draw.

These materials must be cataloged, and this is a traditional library operation. It is also a highly technical process that takes time. To make information about materials of certain kinds more quickly available the Library of Congress has published various acquisitions lists that are generally available. Two of the most significant are the *Monthly Index of Russian Accessions* and the *East European Accessions Index*. The statement already in the record shows their scope in relation to science and technology.

Our Division of Science and Technology, which was organized in 1949 to meet the rising demand for reference services on materials in these fields that followed World War II, prepares bibliographies and other studies to answer inquiries for information.

But the present small staff of this division cannot adequately meet these demands which increased 50 percent between 1957 and 1958 and which would increase even more if we were in a position to make known our potentialities for service. Because of this, I have requested Congress for a substantial increase in the Division's staff and for staff in the Legislative Reference Service to deal with congressional inquiries in these fields.

You have already heard a great deal about abstracting, particularly the services of such private enterprises as Chemical Abstracts and Biological Abstracts. In addition to acquiring, cataloging, indexing, and rendering traditional reference and bibliographic services on much scientific and technical material, the Library of Congress is also pre-

[9] See p. 11, pt. 1, hearings May 2, 6, and 7, 1958.

paring abstracts and otherwise contributing to effective communication in these fields.

Our Air Information Division, for example, is now regularly abstracting more than 100 Soviet scientific and technical journals. During the coming fiscal year this number will be increased to more than 160, and it is expected that this abstracting program will be extended to several other countries during the fiscal year 1959. This division is also preparing critical book reviews of important Soviet monographic literature in the fields of science and is making verbatim translations of significant Soviet books, or parts thereof.

Recently Congress has appropriated funds to the Office of Technical Services of the Department of Commerce which will enable it to publish certain of these abstracts, reviews, and translations, and arrangements are already underway to feed these materials to the Office of Technical Services. Through these channels it should be possible for us to reach a much broader segment of the American scientific community than we have in the past.

Although I have only touched briefly on the Library's contributions to the Nation's efforts in the field of scientific information, I hope you will see why we rather deplore the popular cliché to the effect that the United States has been sitting idly by, letting dust gather on its books, while, it is asserted, the Soviet Union, with consummate efficiency, has digested all that was important of the world's scientific literature.

I do not mean to underestimate the efforts of the U. S. S. R., but the hearings before this committee have surely demonstrated that this country is doing a great deal to make the information in scientific literature, both foreign and domestic, widely available.

There is certainly much more that we can do. One of the most far-reaching proposals that has come to my attention is represented by H. R. 12860, a bill to make counterpart funds available for the acquisition, cataloging, indexing, abstracting, translating, reproducing, and disseminating of foreign scholarly and scientific publications.

Senator HUMPHREY (presiding). Is this the mutual security amendment?

Dr. MUMFORD. No, sir; this is Mr. Dingell's bill.

Senator HUMPHREY. That proposal was originally incorporated as section 4 of S. 3126, the Science and Technology Act. I later introduced a revised version prepared by the staff of this committee (S. 3313) and the same language was incorporated as title V of the proposed staff revision of S. 3316 (page 72 of S. Doc. 90, 85th Cong.). A somewhat similar provision—with exactly the same objectives—was incorporated in the Mutual Security Act as passed by the Senate (H. R. 12181) and adopted by the conferees (H. Rept. 1941, 85th Cong.).[10] I understand that it has also been incorporated in a different form in H. R. 12954, the Agricultural Act of 1958.[11]

Dr. MUMFORD. I realize there is a similar section on that in relation to scientific materials in the Mutual Security Act.

Senator HUMPHREY. I shall give you some unhappy information about the provision included in the Mutual Security Act. Mr. Taber, of the other body, has raised a point of order on it, and we are taking it up in conference this afternoon at 2 o'clock.

[10] See pp. 375, 376.
[11] See p. 374.

The House is trying to knock it out. But we are certainly going to fight to retain it.

Dr. MUMFORD. May I say, Mr. Chairman, that from the standpoint of the Library of Congress we should like to see those provisions broadened to include not only scientific information but other important information, such as economic and cultural information.

Senator HUMPHREY. I agree, Dr. Mumford, and, as you will note from Senate Document 90 (pp. 52–56, and 72), that has been done, both in the original and in the revised version of S. 3126. May I say to you, with all due respect, we were mighty lucky to get the word "scientific" in the Mutual Security Act amendment. That took two and a half days of constant argument with a few of my colleagues. We finally got that in the bill. Now we hope it does not have an untimely demise.

I worked with Congressman Dingell on his bill. We attempted to rescue some of it. I would hope that it will still be passed by this Congress. The Agricultureal Act of 1958, which contains a similar provision, has just been reported out of House committee.

Dr. MUMFORD. The proposal I referred to, if enacted into law, could provide very comprehensive coverage of materials in science and technology published abroad and greater assurance that significant developments in foreign science and technology will not escape the attention of our scientific community because of the language barrier.

To conclude, I think that the diverse efforts of public and private agencies in this country in the field of scientific information are substantial but that they would profit from adequate support and a greater measure of centralized guidance. I personally would prefer to seek appropriations from the Congress for regular library programs such as those administered by our Science and Technology Division, because these are activities which we should continue to carry on. Support from the National Science Foundation or any other agency for a special project that we are specially competent to do and that needs to be done, however, would be appropriate.

As for a central planning and coordinating agency, I believe that we already have in the National Science Foundation an agency competent to supply the overall guidance that would enable those of us in the scientific-information field to make the maximum contribution with the minimum of duplication and waste motion. The Library of Congress, in short, would, as always, be happy to cooperate in the best interests of the scientific community, the Congress, and the Nation.

Senator HUMPHREY. Senator Martin?

Senator MARTIN. From your closing statement, you are seeking to expand your own work in this whole field?

Dr. MUMFORD. We need very badly to strengthen the resources of our Science and Technology Division for answering many inquiries that come to it daily and are increasing constantly.

We do perform various other special projects in cooperation with the National Science Foundation and other agencies of the Government.

Senator MARTIN. Is it your opinion that S. 3126 is a step in the right direction?

Dr. MUMFORD. Mr. Chairman, I have addressed myself only to that part of it which relates directly to the Library of Congress. As I indicated in my statement, that is primarily the acquisition of materials and the international exchange relations, and so on.

Senator MARTIN. You need that additional authorization for your own activities?

Dr. MUMFORD. Not for acquisition work or international exchange. We now have over 16,000 exchange agreements with foreign government agencies, institutions, learned institutions, societies, and so on, around the world. The Library of Congress is the official agent for the exchange of United States Government publications with these institutions.

Senator MARTIN. And you are directing your entire testimony here to that phase of this bill, S. 3216?

Dr. MUMFORD. Not entirely just that, Mr. Chairman. I would say that we believe that the National Science Foundation can provide adequate coordination for these scientific efforts that are being made by other Government agencies, such as the Library of Congress.

Senator MARTIN. And you generally support the bill, S. 3126?

Dr. MUMFORD. This would create a Department of Science and Technology, would it not?

Senator MARTIN. I just want to know your viewpoint.

Dr. MUMFORD. No, I am not supporting the position of creating a Department of Science and Technology.

Senator MARTIN. Getting back to your own field of operations, I should like to ask you to give us, if you can, a list of all libraries in the United States that provide this type of service. Can you do that?

Dr. MUMFORD. By "this kind of service," sir, do you mean answering reference inquiries, or performing special projects for the Government?

Senator MARTIN. One field covered by S. 3126, the storage of technical information, whether they are operated by the Government, supported by Federal funds, or, as nongovernmental facilities.

Dr. MUMFORD. We can undertake that. I am not sure how comprehensive we can make it, because I am not sure that we have detailed records of the programs of every library in the United States.

Senator MARTIN. Also the extent of the Government's contribution to those libraries; do you have that information?

Dr. MUMFORD. I am not positive whether we can provide that. But we will undertake to try it, if we have it. This would be contracts or grants made by the Government to other libraries throughout the country?

Senator MARTIN. Particularly those libraries that are used as Government depositories.

That concludes my questions, Mr. Chairman.

(The material requested follows:)

THE LIBRARIAN OF CONGRESS,
Washington, D. C., July 3, 1958.

Mr. WALTER L. REYNOLDS,
Staff Director, Subcommittee on Reorganization,
Senate Committee on Government Operations,
Senate Office Building, Washington, D. C.

DEAR MR. REYNOLDS: During the hearings of June 25 on S. 3126, Senator Martin requested me to supply him information on contributions or support rendered by the Government to nongovernmental libraries.

To my knowledge, there is very limited support of this kind provided. The National Science Foundation and the National Institutes of Health grant funds to the John Crerar Library in Chicago for the support of the Special Libraries Association Scientific Translation Center. The funds are used for maintaining the depository, publishing a monthly listing of translations received on deposit, and providing photocopies of these translations at a reasonable cost.

The National Science Foundation also has granted funds to the Midwest Interlibrary Center in Chicago to collect and make available hard-to-get periodicals abstracted in Chemical Abstracts and Biological Abstracts.[12]

These are the only major projects directly supported by the Government of which I have knowledge. Support is given indirectly, however, through the so-called depository system. I am enclosing a listing of Government depository libraries which receive one copy of all publications of the United States Government made for distribution and printed through the facilities of the Government Printing Office.[13] A list of depository libraries which receive reports made available through the Office of Technical Services of the Department of Commerce, and a similar list of libraries receiving reports of the Atomic Energy Commission, are also enclosed.

I trust this satisfactorily answers Senator Martin's inquiry. Please do not hesitate to call on me if further information is desired.

Sincerely yours,

L. QUINCY MUMFORD,
Librarian of Congress.

Enclosures.

DEPOSITORY LIBRARIES FOR THE OFFICE OF TECHNICAL SERVICES

Carnegie Library, Pittsburgh, Pa.
New York Public Library, New York
Georgia Institute of Technology, Atlanta, Ga.
Linda Hall Library, Kansas City, Mo.
John Crerar Library, Chicago, Ill.
University of Cincinnati, Cincinnati, Ohio
Detroit Public Library, Detroit, Mich.

DEPOSITORY LIBRARIES FOR THE ATOMIC ENERGY COMMISSION

Alabama: Birmingham, Birmingham Public Library
Colorado: Denver, Denver Public Library
Connecticut: New Haven, Yale University Library
District of Columbia: Washington, Library of Congress
Florida:
    Coral Gables, University of Miami Library
    Gainesville, University of Florida Engineering Sciences Library
Georgia: Atlanta, Georgia Institute of Technology Library
Indiana:
    Indianapolis, Indianapolis Public Library
    Lafayette, Purdue University Library
Iowa: Ames, Iowa State College Library
Kentucky:
    Lexington, University of Kentucky Library
    Louisville, University of Louisville Library
Louisiana:
    Baton Rouge, Louisiana State University Library
    New Orleans, Tulane University Library
Maryland: Baltimore, Johns Hopkins University Library
Massachusetts:
    Cambridge, Harvard University Library
    Cambridge, Massachusetts Institute of Technology Library
Michigan:
    Ann Arbor, University of Michigan Library
    Detroit, Detroit Public Library
Minnesota: Minneapolis, University of Minnesota Library
Missouri:
    Kansas City, Linda Hall Library
    St. Louis, Washington University Library

[12] See testimony of Dr. Alan T. Waterman, NSF, pp. 339–346.
[13] Committee Print, Joint Committee on Printing, April 1955.

New Jersey: Princeton, Princeton University Library
New Mexico: Albuquerque, University of New Mexico Library
New York:
Buffalo, Lockwood Memorial Library
Ithaca, Cornell University Library
New York, Atomic Industrial Forum
New York, Columbia University Library
Rochester, University of Rochester Library
Troy, Rensselaer Polytechnic Institute Library
New York, New York Public Library
North Carolina:
Charlotte, Charlotte and Mecklenburg County Public Library
Raleigh, North Carolina State College Library
Durham, Duke University Library
Ohio:
Cincinnati, University of Cincinnati Library
Cleveland, Cleveland Public Library
Columbus, Ohio State University Library
Toledo, University of Toledo Library
Youngstown, Youngstown University Library
Oklahoma: Stillwater, Oklahoma Agricultural and Mechanical College Library
Oregon:
Corvallis, Oregon State College Library
Portland, Portland Public Library
Pennsylvania:
Philadelphia, University of Pennsylvania Library
Pittsburgh, Carnegie Library of Pittsburgh
University Park, Pennsylvania State University, Pattee Library
Puerto Rico: Rio Piedras, University of Puerto Rico, Main Library
Rhode Island: Providence, Brown University Library
South Carolina: Columbia, University of South Carolina, McKissick Memorial Library
Tennessee:
Knoxville, University of Tennessee Library
Memphis, Memphis Public Library
Nashville, Joint University Libraries
Texas:
Austin, University of Texas Library
Dallas, Southern Methodist University Library
Houston, The Rice Institute Library
San Antonio, San Antonio Public Library
Utah: Salt Lake City, University of Utah Library
Virginia:
Blacksburg, Virginia Polytechnic Institute Library
Charlottesville, University of Virginia, Alderman Library
Washington: Seattle, University of Washington Library
Wisconsin:
Madison, University of Wisconsin Library
Milwaukee, Milwaukee Public Library
California:
Los Angeles, University of California Library
Menlo Park, Stanford Research Institute
San Diego, San Diego Public Library
Berkeley, University of California General Library
Illinois:
Chicago, John Crerar Library
Chicago, University of Chicago Library
Urbana, University of Illinois Library

Senator HUMPHREY. Dr. Mumford, you are of the opinion, I gather from your testimony, that there is a need for a central coordinating agency?

Dr. MUMFORD. Yes, Mr. Chairman, I do feel that there is.

Senator HUMPHREY. And you feel that the National Science Foundation, as presently established by statutory authorization, has first of all the authority to undertake such a mission; and secondly, that

it would be desirable—the agency itself, by the nature of its work—to have it continue as the appropriate agency to effect the coordination?

Dr. MUMFORD. Yes. From my knowledge of the situation, it would seem to me that the broad charter of the National Science Foundation should be adequate to accomplish this.

Senator HUMPHREY. I think it is. The language of the statute establishing the Foundation is very broad, and it is strictly a matter of taking upon itself the responsibility for this very broad field of endeavor of coordination and correlation of the many documenting activities, both public and private. It really goes into the private sector, in the sense of keeping a running account of what is going on in the private sector.

Dr. MUMFORD. That is right.

Senator HUMPHREY. You would have no difficulty working under such an arrangement?

Dr. MUMFORD. Not at all. We have had, for the projects we have performed through support of the National Science Foundation, a very workable relationship.

Senator HUMPHREY. I want to call your attention to a bill that you referred to in your testimony, H. R. 12860, to make counterpart funds available for acquisition, cataloging, indexing, translating, and producing and disseminating foreign scholarly and scientific publications.

As I have stated, that proposal was incorporated in S. 3126, in its original form, and as proposed to be revised by the staff of this committee, which I introduced as a separate bill (S. 3313) in the Senate on February 19, 1958. That bill provided as follows:

[S. 3313, 85th Cong., 2d sess.]

A BILL To amend the Mutual Security Act of 1954 in order to provide for overseas programs for scientific and technological information

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That title IV of the Mutual Security Act of 1954 is amended by inserting at the end thereof the following new section:

"SEC. 422. OVERSEAS PROGRAMS FOR SCIENTIFIC AND TECHNOLOGICAL INFORMATION.—(a) The National Science Foundation is authorized to establish programs outside of the United States for collecting, collating, translating, abstracting, and disseminating scientific and technological information, and to conduct and support other scientific activities, including cooperative programs and projects between the United States and other countries. Notwithstanding section 1415 of the Supplemental Appropriation Act, 1953, section 105 of the Agricultural Trade Development and Assistance Act of 1954, or any other provision of law, the Foundation may, in carrying out the provisions of this section, or, in cooperation with governmental and other agencies, use currencies, or credits for currencies, of any foreign government (1) held or available for expenditure by the United States and not required by law or agreement with such government to be expended or used for any other purpose, or (2) made available under the provisions of subsection (b) of this section.

"(b) In order to make additional funds available for the purposes of this section the Secretary of State is authorized to enter into an executive agreement or agreements with any foreign government for the use of currencies, or credits for currencies, of such government deposited pursuant to agreements entered into under section 142 (b) of this Act, or section 115 (b) (6) of the Economic Cooperation Act of 1948, or pursuant to section 105 of the Agricultural Trade Development and Assistance Act of 1954."

Provisions similar to that bill have been incorporated in H. R. 12181 and in H. R. 12954, which is the overall agricultural bill, as reported out by the Committee on Agriculture of the House of Repre-

sentatives. Title I of the bill amends section 104 of the Agricultural Trade Development and Assistance Act of 1954.

Dr. MUMFORD. Yes, sir.

Senator HUMPHREY. That is also known as Public Law 480. It amends it by inserting a new section 105 as follows:

AMENDMENT TO SECTION 104, PUBLIC LAW 480 (H. R. 12954), 85TH CONGRESS, 2D SESSION, JUNE 19, 1958

SEC. 105. Section 104 of such Act is amended by adding the following new paragraph:

"(m) For financing under the direction of the Librarian of Congress, in consultation with the National Science Foundation and other interested agencies, (1) programs outside the United States for the analysis and evaluation of foreign books, periodicals, and other materials to determine whether they would provide information of technical or scientific significance in the United States and whether such books, periodicals, and other materials are of cultural or educational significance; (2) the registry, indexing, binding, reproduction, cataloging, abstracting, translating, and dissemination of books, periodicals, and related materials determined to have such significance; and (3) the acquisition of such books, periodicals, and other materials and the deposit thereof in libraries and research centers in the United States specializing in the areas to which they relate;".

My question is, Do you support that language?

Dr. MUMFORD. I couldn't support it more heartily, Mr. Chairman. I think it would be a tremendous thing as far as getting this foreign material quickly, getting it cataloged and indexed and available to the people who need it here.

Senator HUMPHREY. The language of this section is supported in the House report (No. 1939) as follows:

SECTION 105 (H. REPT. 1939), 85TH CONGRESS, 2D SESSION, JUNE 19, 1958

SECTION 105

This section authorizes the use of foreign currencies accruing under title I of the act to be used for financing an intensified and expanded program of locating, evaluating, translating, and obtaining foreign books, periodicals, and other publications outside the United States which are of scientific, technical, and cultural significance in this country. Such programs have been carried on rather intensively by the Library of Congress since World War II and substantial dollar appropriations have been used for this purpose. This section would not only permit the expansion of this valuable work but would very possibly permit the use of some foreign currencies in place of appropriated dollars.

Then I would note also at this point that provision is incorporated in the Mutual Security Act of 1958, which would also amend section 104 of the Agricultural Trade Development Assistance Act of 1954, Public Law 480, 83d Congress, as follows:

AMENDMENT TO SECTION 104, PUBLIC LAW 480 (H. R. 12181), 85TH CONGRESS, 2D SESSION, JUNE 6, 1958

(m) Section 104 of the Agricultural Trade Development Assistance Act of 1954 (Public Law 480, Eighty-third Congress; 7 U. S. C. 1704), as amended, is further amended by adding after paragraph (j) the following new paragraph:

"(k) To collect, collate, translate, abstract, and disseminate scientific and technological information and to conduct and support scientific activities overseas including programs and projects of scientific cooperation between the United States and other countries such as coordinated research against diseases common to all of mankind or unique to individual regions of the globe."

I should like to insert in the record at this point pertinent extracts from Senate Report No. 1627, dated May 26, 1958, the first conference

report (H. Rept. 1941), dated June 20, 1958, and the second conference report (H. Rept. 2038), dated June 26, 1958, relating to the proposed amendment.

[Extract from Senate report No. 1627 (to accompany H. R. 12181), dated May 26 ,1958

L. SCIENTIFIC ACTIVITIES ABROAD

The bill adds to section 104 of the Agricultural Trade Development and Assistance Act of 1954, as amended (Public Law 480) a new subsection (k) which would make it possible to use foreign currencies accruing under title I of Public Law 480 to—

> collect, collate, translate, abstract, and disseminate scientific and technological information and to conduct and support scientific activities overseas.

It is specified that these activities could include—

> programs and projects of scientific cooperation between the United States and other countries, such as coordinated research against diseases common to all of mankind or unique to individual regions of the globe.

Activities of the kind authorized by the amendment seem to the committee to hold great promise. There is, for example great need in the United States for translations and abstracts of scientific works published abroad. There is equal need abroad for such works published in the United States. There are many excellent scientific institutions abroad which could do even more effective work if they could receive even marginal increments in funds, and these funds are frequently available, in local currencies, as a result of operations under Public Law 480. Obvious possibilities are raised of fruitful collaboration between the American and foreign scientific communities. This collaboration should be advantageous not only in terms of its scientific results but also in terms of better people-to-people understanding. This is perhaps particularly true in regard to medical research.

The amendment does not in itself make funds available. It simply authorizes the use of Public Law 480 foreign currencies for the purposes stated. The amendment leaves to the President the question as to which executive agencies will administer these programs. However, it is contemplated that the National Science Foundation might be a principal collating and disseminating agency of general scientific information and that the Public Health Service would be active in regard to collecting, translating, and disseminating medical information.

[Extracts from section 502 (l), H. Rept. 1941 (to accompany H. R. 12181) dated June 20, 1958]

USE OF PUBLIC LAW 480 CURRENCY FOR SCIENCE (SEC. 502 (l))

The Senate amendment amended section 104 of the Agricultural Trade Development and Assistance Act of 1954, as amended (Public Law 480), by adding a provision authorizing the use of Public Law 480 currencies for scientific activities. Under the provision, Public Law 480 currencies could be used to collect, collate, translate, abstract, and disseminate scientific and technological information. They could also be used to conduct and support scientific activities overseas, including programs of scientific cooperation between the United States and other countries. Such cooperative projects and programs would include coordinated research against disease. The House bill contained no similar provision.

The managers on the part of the House receded and accepted the Senate provision.

Recent events have demonstrated the need for increased emphasis on scientific activities. There is an urgent need for translations and abstracts of scientific articles and books, both in the United States and abroad. This section will help meet that need. Furthermore, this provision will result in the United States, through cooperative activities, securing the benefits of increased scientific activity and research abroad. It will help in eliminating diseases common to all mankind and those which are common to particular regions.

The provision does not in itself make funds available to any agency of the United States. It authorizes the use of Public Law 480 currencies for the purposes stated but leaves to the President the question as to which executive agency will administer the program.

AMENDMENTS TO SECTION 502 (1), H. REPT. 2038 (TO ACCOMPANY H. R. 12181), DATED JUNE 26, 1958

The final conference report amended the second paragraph of the original conference report, No. 1941, previously shown, to read as follows:

The managers on the part of the House receded and accepted the Senate provision with an amendment to make clear that no foreign currencies can be used for this purpose unless specific appropriations are made therefor.

House Report No. 2038 also deleted the fourth paragraph.

This is a broader provision than the one in the House bill in the sense that it attacks a specific area such as diseases. And it is not as detailed as the provisions of H. R. 12954 in terms of the administration of these funds. The administration of H. R. 12954 would be under the jurisdiction of the Library of Congress, or the Librarian of Congress, with the cooperation and guidance of the National Science Foundation.

But, either of these provisions, as I understand it, you support?

Dr. MUMFORD. Yes. I think either would be desirable. But I should like to emphasize again that the important information needed by our Government is not limited to science. In the field of economics, for instance——

Senator HUMPHREY. I couldn't agree with you more.

Dr. MUMFORD. There is a great deal of information we need. And there is much vital cultural information that is needed by our Government. I should like very much to see, if it were possible, those provisions in the Senate bill broadened as to the scope of the materials and the latitude of operations, so that there would be no question that the material could be acquired, cataloged, or indexed, possibly even reproduced or published abroad in index form. I think there should be much latitude there for operation.

Senator HUMPHREY. I think that the proposed amendment to the Mutual Security Act, the extension of Public Law 480 which passed the Senate, has rather broad language in it for the purposes to which you are referring. This was before the action took place in the House. All of this is in a sort of a political snafu at the moment, in the sense that we passed Public Law 480 extension as a separate bill. The House has also placed this in an omnibus farm bill which has held the whole thing in abeyance until we could reconcile these differences, which we are attempting to do. That is why I left the room here about 35 minutes ago, to see if we couldn't get some action up in the Senate Committee on Agriculture that will break this logjam which we temporarily face.

Dr. MUMFORD. I subscribe most heartily to the principle of using the counterpart funds for the acquisition of materials and cataloging and indexing them and making them available in this country.

Senator HUMPHREY. Thank you very much, Dr. Mumford. We want to thank you for your cooperation. And I want you to know that the letter that you sent me earlier on the subject matter of S. 3126 was read very carefully, and was made a part of the official transcript. I felt that you raised many worthwhile and sound criticisms of the proposal.

Again, I should like to repeat for the record that proposals such as S. 3126 are designed, not as an instrument of perfection, but as a

means of gaining testimony and additional knowledge and information which we surely have to be able to do.

Dr. MUMFORD. Thank you.

Senator HUMPHREY. Thank you very much.

I wish to have printed in the record, at this point, a letter which I have received from Senator Wiley, along with certain documents and articles which he has asked to be made a part of the record.

(The material referred to follows:)

UNITED STATES SENATE,
June 24, 1958.

Hon. HUBERT HUMPHREY,
Chairman, Subcommittee on Reorganization,
Senate Committee on Government Operations,
Senate Office Building, Washington 25, D. C.

MY DEAR SENATOR HUMPHREY: I am pleased to submit herewith a statement which I would very much appreciate having incorporated in the printed hearings on S. 3126, the Science and Technology Act of 1958.

This statement conveys my own deep convictions in support of the basic objective of the acceleration and coordination of scientific research and of the prompt dissemination of such research.

First, however, I should like to convey my sincere commendation to yourself and to your associates for the impressive contributions which you have already made to this field.

Without attempting to get into the details of S. 3126, I feel that it represents on the whole a most significant step forward in America's effort to maintain leadership in science for both peaceful and defense purposes.

Twice, now, it has been my pleasure on the Senate floor to commend the work of your subcommittee; and I am pleased to do so again in this instance.

Representing, as I do, a State with a long and deep interest in scientific research into the life sciences and other sciences, I feel particularly keenly on the importantance of breaking through to new frontiers of scientific discovery.

Moreover, with especially deep ties to my alma mater, the University of Wisconsin, I feel, as well, the need to help further to make it and other great universities of this land—the advanced discovery and dissemination posts such as you and your colleagues envision.

We, as a nation, have not, in my judgment, even begun fully to utilize the great scientific assets which our universities represent.

Further, let me state that since I am, like yourself, a member of the Senate Committee on Foreign Relations, I have been especially interested in the testimony you have heard and will hear as regards the international significance of your subcommittee's work.

It is clear that America can and should benefit more expeditiously and to a far greater extent than it has already benefited from the fruits of scientific research beyond our borders. Likewise, it can and should contribute more promptly and to a greater extent to peaceful scientific research overseas. For these purposes, I make the specific suggestion for optimum utilization of high speed data processing machinery.

In any event, it is my feeling that the Senate Committee on Foreign Relations should, in its own right, give its appropriate attention to consideration of how it can supplement the worthy work performed by your subcommittee.

Again, let me state that your committee's Senate Document No. 90 and the hearings which you have held and have published to date have been most welcome; not only by myself and other legislators but, I am sure, by the scientific community of our land and overseas as well.

In conclusion, while men may differ as to some of the elements in S. 3126, as such, they do not and should not differ on the need for better mobilization of scientific data already discovered and to accelerate the discovery of new data.

Be assured that I stand ready to render any service possible to your subcommittee in its further deliberations.

With all good wishes, I remain,

Sincerely yours,

ALEXANDER WILEY.

STATEMENT OF HON. ALEXANDER WILEY, A UNITED STATES SENATOR FROM THE STATE OF WISCONSIN

The pace of scientific research, translation, and dissemination of data must be quickened.

Time is of the essence. Limited availability of skilled manpower is likewise of the essence.

We cannot afford to use horse and buggy methods of research collation in a supersonic jet-nuclear age.

Obsolete forms of 3 by 5 index cards—assembled laboriously in the thousands and in the millions—are incongruous in a day and age when 100 million pieces of information can be fed into and stored in a high speed electronic computer for instantaneous retrieval thereafter.

PAST COMMENTS IN CONGRESSIONAL RECORD

By way of background now, I invite attention to certain of my recent statements which may be found in the Congressional Record.

I should like to single out, in this instance, only those references bearing upon this one phase of the utilization of electronic computers so as to achieve many of the objectives contemplated under S. 3126.

Respectfully, therefore, I invite attention to the Congressional Records for the following dates: May 26, 1958, beginning on page 8452; June 9, 1958, beginning on page A5207; June 14, 1958, beginning on page A5430; June 16, 1958, beginning on page A5441.

The purpose of each of these remarks is this: It is essential that we electronically husband the resources of the researchers of the United States. Their greatest resource, I reiterate, is time.

The fact is, as your subcommittee has long since ascertained, that scientific, including medical, researchers find that they may often literally have to spend months and months simply attempting to comb existing literature for prior material bearing upon their subject of inquiry. Even then, their research may prove far from complete and accurate.

At the present time, obviously, the United States is speeding up the pace of its scientific research. This very acceleration, may however, result in a still more laborious effort being necessary to sift through the maze of literature already accumulated; and it will result in the further addition to that maze unless horse-and-buggy methods are changed.

If the process of research into prior discovery is not, therefore, to become a worse bottleneck than it already is, it is essential in my judgment that the possibilities of electronic science be mobilized so as to record the data in ways in which it can virtually instantaneously become available.

Basically, as you know, high-speed computation provides a key to one or both of two objectives: (1) Either to get a large number of answers from a small amount of data, or (2) to sift from a vast amount of data a few key answers.

Thus, in unlocking the great mysteries of science, where vast amounts of raw information must be assembled, but where only a relatively few items may prove the keys—in this process, computers can play an indispensable role.

As an example, as we are all aware, right now, the earth satellites that beep information on conditions in outer space are pouring into computers tremendous amounts of data which are collated and reduced to meaningful pattern.

CREATIVE-TYPE FEATS OF COMPUTERS

I need not remind my colleagues of what automatic data-processing systems have already accomplished in industry and elsewhere.

I am thinking now, however, of not simply the storage and retrieving of data; I am thinking of the almost unbelievable creative-type feats of electronic computers such as the design of a high-speed 540 billion electronic volt (physics) accelerator.

And it is this "creative" side (if you can call it that) of computers which makes even their almost unbelievable accomplishment of storage and retrieving of data seem relatively modest.

PROVIDING MACHINES FOR UNIVERSITIES

Above all, I stress that in the process of making the universities of this land centers for the dissemination of information, we cannot fail to make the universities "supercenters" for automatic data processing.

The fact of the matter is, however, unfortunately, that the universities at present definitely do not have sufficient mordern equipment of the type which they will need if they are to complete the tasks envisioned under S. 3126.

At the conclusion of my remarks I will reprint the text of correspondence which I have received from Mr. John W. Carr, president of the Association for Computing Machinery. One of the issues touched upon by Mr. Carr is the fact that, unfortunately, the universities still do not generally have this type of modern equipment now available.

RUSSIAN STRESS ON COMPUTERS

The principal thesis of his letter to me, however, is that the Soviet Union is moving full-speed ahead in its development of computers.

I should like to point out that, even if we were not in a deadly race for survival, with the Soviet Union, it would be essential that we improve our task of disseminating scientific information. The fact is, however, that we are indeed in such a deadly race. So, we cannot fail to note the Soviets' grim intention to utilize these computers—and to do so, in ways which we, at present, may not have fully fathomed.

Fortunately, the United States is undoubtedly in the lead so far as development of computers is concerned. This is in itself a tribute to our free enterprise system.

In all frankness, however, it will do us comparatively little good as a nation if we are in the lead in such a way that the computers here are only used for the mass production of, say, better and more inexpensive refrigerators, convertibles, and air conditioners. For, as important as those purposes are to our civilian economy, these uses in and of themselves will not help assure the success of this country in its venturing into outer space and into the subnuclear world of physics, chemistry, biology, and the other sciences.

Not being a technician, I do not attempt to offer comments which only a technician could offer so far as types of future application of these electronic marvels are concerned. But, even as a layman, I can sense the enormous possibilities which are available in this field.

It makes little sense, in my judgment, for the geniuses of American science to break through into new worlds of discovery of the 20th century only to have the results of their work abstracted and filed in a 19th century fashion on index cards or the equivalent.

WASTEFUL DUPLICATION OF EFFORT

Instance after instance has already been cited to your subcommittee, and to other groups, which have explored this field showing how time and time again, too late, American scientists have unfortunately found that they duplicated work long since performed not only within this country but abroad.

Such duplication of effort, such pitiful loss of time and manpower, is, in my judgment, almost a sin; particularly in high-priority fields of national survival.

Let us, therefore, bring the dissemination of information up to par as of this latter half of the 20th century. Let us utilize these machines for every possible service they can perform; such as language translation. Let us utilize them creatively and imaginatively.

I point out this fact: these machine and systems are costly. So, let us naturally weigh the costs involved. But let us not be "penny wise and pound foolish," for we may find that in failing to utilize these systems, we lose a vast amount of money, instead of saving it.

GROWTH OF PRIVATE ELECTRONICS INDUSTRY

The electronics industry has grown enormously. An article in the June 21, 1958, issue of Business Week refers to an estimate that there are now some 1,700 computers in operation; including business, Government, and the Armed Forces. By 1966, more than 10,000 large-scale digital computers may be in operation in our country and an estimated more than 170,000 professionals will have to be trained to run them.

In the April 1958 issue of the magazine, Electronics Industries, from pages 110 through 115, there are listed a long roster of diverse associations serving the electronic industries; many of which are directly engaged in the field of computers.

Let us tap the most expert contributions that these associations and their members may be in a position to offer to our scientific quest.

In my study of this problem, I have searched for fact with many of these associations, with the Electronic Industries Association and with other groups including many leading corporations.

I have been in contact with some of the great universities of the land; notably the Massachusetts Institute of Technology, whose center for communications sciences, for example, was referred to in my comments of June 16 in the Congressional Record.

Likewise, I had asked a professional member of the staff of the Senate Committee on Foreign Relations to explore the international phases of this problem, in my behalf, for example, to contact the United Nations, Educational, Scientific and Cultural Organizations which will be holding a conference on computers next year. And he has accordingly amassed a considerable variety of material which will be gladly available to this subcommittee, over and above the data which follows.

LIST OF APPENDED MATERIALS

I should like, now, to list in order the various items which I am asking the subcommittee to reprint at the conclusion of my comments.

(1) The first is the text of the letter and appended materials from Mr. John W. Carr, president of the Association for Computer Machinery. Mr. Carr is, likewise, president of the College of Engineering at the University of Michigan, at Ann Arbor.

(2) The second is a study entitled "The Use of Soviet Medical Research Information by American Medical Scientists," published by Herner, Meyer, & Co., of Washington, in 1957.

This study will, I believe, provide interesting background to the expert testimony which you will receive from the National Institutes of Health.

(3) The third is a brief memorandum from the National Academy of Sciences National Research Council, as forwarded by Prof. Robert S. Ledley to Mr. Julius N. Cahn, of the staff of the Senate Foreign Relations Committee.

(4) The fourth is a response to an inquiry which I had conveyed to the Veterans' Administration. I had inquired of Administrator Sumner G. Whittier as regards the use of electronic computers by VA medical researchers. Mr. Whittier responded in a most constructive fashion, and I should like to append the text of his reply.

(5) The fifth item consists of a letter, and enclosed memorandum, from the distinguished physician who is directly in charge of the medical research programs at the National Institutes of Health in Bethesda.[14]

I had written to Dr. James A. Shannon asking for a report on the present and anticipated uses of electronic data processing and computer facilities at the great research center which he heads.

In response, Dr. Shannon conveyed a very helpful memorandum, outlining four major areas of possible application of this equipment in medical research; including data processing, mathematical computation, model simulation, and data retrieval.

This memorandum, prepared by the Office of Research Planning, provides tremendous food for thought.

I commend it to my colleagues' attention. I know the high regard which all of us feel for the great organization which Dr. Shannon heads. With sufficient support for the computer program, that organization can become ever more effective, as I have every reason to believe it will be.

I may say, that at my request, Mr. Cahn, as committee consultant, has assembled a file of related international medical studies, over and above the items cited above. All of these bear upon future use of computers for advanced research purposes, not only by our own but by foreign scientists as well.

Finally, let me say that, although I have emphasized in these remarks—the subject of machines, I do not, for one moment, underestimate the significance of the human beings behind the machines.

On the contrary, the giant computer is but a giant slave of man. It will do what man instructs it to do.

There is no substitute for human values. The machines will deemphasize certain manual and lower-type skills of man, but will put new emphasis on man's higher faculties.

It is my purpose, as I know it is the purpose of your subcommittee, to give all possible encouragement to those high faculties. Never before in human history has it been more important that we inspire the soul of man which is, in truth, the essence of man.

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[14] Letter from Dr. Shannon and statement covering the background, present status, and future possibilities in the use of electronic data processing and computing facilities, in biological and medical research is shown on p. 492.

In commenting repeatedly as I have, in the Congressional Record, and in forwarding my comments to various key individuals, I have found that I have tapped a deep reservoir of interest. Responses have poured into my office; because more and more Americans each day appreciate the significance of this general subject of computers. So, I should like to quote, in conclusion, the words of Mr. Ralph J. Cordiner, Chairman of General Electric Co.:

"When the history of our age is written, I think it will record three profoundly important technological developments: Nuclear energy, which tremendously increases the amount of energy available to do the world's work; automation, which greatly increases man's ability to use tools; and computers, which multiply man's ability to do mental work.

"Some of our engineers believe that of these three, the computer will bring the greatest benefit to man."

ASSOCIATION FOR COMPUTING MACHINERY,
New York, N. Y., June 18, 1958.

Senator ALEXANDER WILEY,
United States Senate,
Washington, D. C.

DEAR SENATOR: I am responding to your request for information on computers in your letter of May 27.

I am enclosing a list of specifications of digital computers in the Soviet Union that I have drawn up along with a similar set of specifications on United States computers taken from an article by myself and Prof. Alan J. Perlis of Carnegie Institute of Technology in Control Engineering magazine.

I think it is of interest to note that as of 1956, the Soviet Union was mass-producing three computers (Strella, M–2 and Ural) that are comparable to equivalent United States computers such as the IBM–704, Univac II, and IBM-650 or Datatron 205. A Ural machine has recently been installed in India on a barter agreement between these two countries; it appears that the United States was undersold in this case.

Over 50,000 copies of a book, aimed at Soviet high school students, and stressing digital computers and their use, are slated to be distributed in the Soviet Union in 1958. A recent translation of the National Science Foundation, also enclosed, describes a scientific meeting on application of computers to problems in language translation held in Moscow in 1957 (a more exact copy may be obtained from NSF, my copy being secondhand). A similar meeting has just been completed in Moscow in May 1958, according to persons who have just returned from the Soviet Union.

An Academician, S. A. Lebedev, of the Academy of Sciences, is 1 of about 20 who have been appointed to lead the new research establishment being set up in Siberia. He is the top scientist in digital computers in the Soviet Union.

This indicates the emphasis that has been placed on this area by the Academy of Sciences.

One of our chief needs in this country is for top-level equipment for universities without funds to obtain them. I enclose a letter to Dr. Klopsteg of the National Science Foundation, stating the case for such grants.

It should be evident that while the opinions expressed in this letter and in that to Dr. Klopsteg are, I think, the general opinion of the vast majority of members of the ACM, they have not been approved by the National Council, and therefore are not the established policy of the organization. Moreover, the charter of the ACM expressly states that it is a nonprofit organization and therefore should not participate in any sort of lobbying activity.

Therefore, while I will be pleased to have you quote anything I have said in the letter to Dr. Klopsteg, and although there is certainly no reason why it should not be mentioned that I am president of the ACM, the opinions expressed in the letter to Dr. Klopsteg are at present only my own, as associate professor of mathematics at the University of Michigan.

In conclusion, I think the Soviet Union, while still behind in this area, is catching up with us in both production, 40 large Strela machines this year, according to British sources, and in use. Since much of future scientific progress will depend on wise use of these machines, we should look to our present lead before it dwindles to a sputnik like situation.

Very truly yours,

JOHN W. CARR III,
President of the ACM.

Enclosures: Conference on the problem of development and construction of information machines. Table of characteristics of Soviet digital computing machines. Letter to Dr. Klopsteg.

[Voprosy Yazkoznaniya No. 5, 1957, pp. 161-162]

Conference on the Problem of Development and Construction of Information Machines

Y. A. Mal'chuk

A scientific and technical conference, organized by the Laboratory of Electric Modeling (LE), Academy of Sciences, U. S. S. R., and devoted to the problem of development and construction of information machines with a high-capacity, long-time memory was held in Moscow from May 28 to 31, 1957. Naturally, the problem of creating specialized information and translation machines raised the general problem of recording, storing, and converting scientific information, a problem that is closely connected with various linguistic subjects. Therefore, logicians, specialists in general semantics, and linguists took part in the work of the conference along with mathematicians and engineers. (In all, more than 500 persons, representatives of 90 different organizations and institutions attended.) In the course of 13 sessions (3 plenary, 5 technical, and 5 general-theoretical sections) 56 reports and communications were presented. Here, reference is made only to basic reports which are of recognized interest not only for philologists in general but also for those working in the field of machine translation in particular.

Prof. L. I. Gutenmakher in his report Electric Modeling of Certain Processes of Mental Work by Means of Information Machines With a High Internal Memory gave a survey of the great potentialities of electronic machines: The practically unlimited memory capacity, the tremendous high operating speed, ability to perform logical operations of high complexity, etc. But in order to use those technical potentialities, logicians and linguists should first solve the problem of creating a so-called information language in which the information is programed for machines, and the problem of the relationship of this language to actual languages in which the scientific information is written.

Senior Engineer L. L. Mokhel' (LE) proposed a project of an extremely large-capacity automatic dictionary.

Associates of the Department of Applied Mathematics (OPM) Academy of Sciences, U. S. S. R., E. Z. Lyubimskiy, S. S. Kamyain, and M. I. Filippova reported on the principles of automatic scanning of symbols by machines; they worked out a program for scanning Latin script for the Strela computer. Automatic scanning of the text will significantly facilitate the input of information into the machine and also may be used for automatic typesetting in printing shops.

A report of Engineer L. S. Levinskiy (LE) was devoted to an automatic device serving to convert printed text into audible speech.

In this report General Problems of Machine Translation, Prof. A. A. Lyapunov (OPM) pointed out that the first experimental operations in machine translation already permit us certain generalizations. In continuing a compilation of systems of formal rules for translation from one language into another instead of empirical searches in each individual case, general formal rules for constructing these systems should be developed, that is, reduce to algorithms the very process of creating translation algorithms. (Note: This term is taken from the field of mathematics, where it is used to designate one of the basic mathematical concepts; an algorism or algorithm is defined as any system of computations obeying strictly determined rules, which after any number of steps are known to lead to the solution of the postulated problem. Cf. BSE, [*Bolshaya Sovetskaya Entsiklopediya* (Great Soviet Encyclopedia)], Vol. 2, p. 65.) This would permit us to instruct the machine to work out independently the rules of translation using parallel text in two languages and a previously prepared dictionary. Therefore, we must strive for the development of maximum generalized methods of formal analysis of languages.

One of these methods was set forth by O. S. Kulagina (OPM) who proposed a system of theoretical-set notions making it possible to choose in a given language groups of terms (analogous to parts of speech) as certain classes of equivalence.

Vyacl. Vs. Ivanov (Moscow State University) while speaking on the linguistic problems of creating a machine language for information machines, proposed approaching the construction of this abstract language by providing special languages for individual areas of sciences, and also by creating simplified conditional models of actual languages. It is necessary to devote particular attention to the semantic side. The semantics of abstract language must be reduced to a set of a minimum number of simple elements (so-called semantic sets). Thereby, it is possible that, upon conversion from the concrete language to the information language we will succeed in accomplishing not a literal translation but an abstract with the omission of superfluous text.

A report on the mathematical logic problems of creating an information language was given by V. A. Uspenskiy, Candidate in Physicomathematical Sciences (Moscow State University), who stressed the importance of linguistics as an applied science. G. M. Vleduts, Candidate of Chemical Sciences (Institute of Scientific Information, Adacemy of Sciences USSR), and associates of the Laboratory of Electric Modeling, V. K. Finn, N. M. Yermolayeva, and Yu. A. Skikhanovich reported on their work on information languages for chemistry and geometry.

The speeches of V. K. Finn and D. G. Lakhuta (LE) were devoted to the problem of semantic requirements of an information language and the report of I. N. Shelimova (LE) to the system of coding of words for an information machine.

G. V. Chakova (OPM) reported on the experimental translations of mathematical texts from French into Russian on the "Strela" computer.

Here are samples of translations which are some of the first produced by Strela:

1. Nous partagerons des integrales en deux categories differentes—My razdelim eti integraly na dve raslichuyye kategorii [We divide these integrals into two different categories].

2. Les relations que nous avons trouvees entre les racines et les coefficients d'une equation conduisent assez naturallement a l'étude des formes symmetriques—Sestnesheniya——toryye my nas——i mezhdu kornyami i ---------- ---------- [The relationships which we found between the roots and coefficients of the equation lead sufficiently to the study of symmetrical forms.]

3. Cette transformation pourrait s'effectuer par les calculs relativement simples, en appliquant la remarque suivante, Eta——(Note: The translation is given in exactly the same form as rendered by the machine.) [This transformation can be accomplished by relatively simple computations utilizing the following remark.]

Reports on procedures of formal analysis of concrete languages both for information purposes (Russian), and for purposes of machine translation (German, English, Hungarian, Chinese) were given by A. L. Shumilina and A. M. Volotskaya (LE), X. X. Ravzia (Moscow State Pedagogical Institute of Foreign Languages), T. N. Moloshnaya (OPM), I. A. Mal'chuk (Institute of Linguistics, Academy of Sciences, USSR), and M. V. Sefranov (Institute of Oriental Studies, Academy of Sciences, USSR).

The entire conference showed that the growth of electronics and the widening of its sphere of application places serious demands upon linguistics. Solution of clearly practical linguistic problems for information and translation machines is impossible without successful work on such theoretical problems as methods of phonological and syntactical analysis, the problem of content layout, etc. As was clarified through cooperation between philologists, mathematicians and engineers, the work requires of linguists, that they should obtain clarity and sequence of thought, strictness in the definition of ideas, and an algorithmic approach to the description of language phenomena. But this introduces a new problem—the development of linguistics as an exact science widely using mathematical methods and devices and mathematical logic ("mathematical linguistics").

In the resolutions of the conference it was pointed out that the development of work on mathematical linguistics and machine translation and also the simultaneous and regular publication of the results are of very great importance to Soviet science and the national economy. Therefore it was acknowledged as necessary to create a special printed organ (similar to the periodical "Mechanical Translation" in the USA) and to organize a corresponding sector in the Institute of Linguistics, Academy of Sciences, USSR, and to prepare specialists in this field in the philological faculties of the universities.

A Table of Characteristics of Soviet Digital Computing Machines

By John W. Carr III, University of Michigan

A list of the characteristics of four digital computers in the Soviet Union are included in a table herewith. The information included is from the references given in the bibliography. Unfortunately, much information is inprecise or unavailable, but those data given are correct to within the author's knowledge.

Apparently the BESM and Strela are very similar in design, and from Kitov's book it is not always plain what computer is under consideration.

Readers with further references or further information are requested to notify the author.

The "number trial" under "Word-Length" lists (mantissa length, exponent length, number of digits to left of radix point). The instruction pentad lists (first address digit length, second address length, third address length, special-normalization or breakpoint digits, operation digit length).

Table of Characteristics of Soviet Digital Computing Machines

	M-2	Ural	BESM	Strela
Builder	Energetics Institute of Academy of Sciences.	Scientific Research. Institute of, Ministry of Machine and Instrument Const.	Academy of Sciences, U. S. S. R.	
Date completed	1954	1955 "Quantity later"	1954?	1955 "Quantity later."
Pulse Rate	300–500 kc	280 kc		
Type	Binary, parallel 3-address floating Pt. Parallel storage.	Binary series-parallel single-address. Fixed point.	Binary Floating pt. parallel storage.	Binary.
Word Length	(28, 6, 0) (34, 0, 0)	(36, 0, 0)	(32, 5, 0)	(35, 6, 0).
Instruction	(10, 10, 10, 4)		(11, 11, 11, 1, 5)	(12, 12, 12, 1, 6).
No. of Insts	20	17		28.
Storage	512, 34-bit CRT. 512 Drum. 50,000 μ tape.	1024 Drum. 40,000 μ tape. 75 words/sec.	1023 39-bit CRT 296-word. Fixed diode store. 5120 Drum (750 rev./sec.). 4 x 30,000 mag. tape (400 words/sec.).	2048 43-bit CRT.
Indexing systems		Register as B-box		
Registers	A, B, C, E	Accumulator, "Register"		
Area		40 square meters	100–200 m²	100–200 m².
Input-Output	Paper tape 400 chars./sec. input on paper tape octal-decimal.	Perforated film 75 words/sec. input, 5 words/sec. output, octal-decimal.	Input punched tape 20 words/sec. Output-photoprinter 200 words/sec. Mechanical Printer 15 words/sec.	Punched tape, punched cards. Octal-decimal hexadecimal.
Applications	"Automatize the combined electric system of European USSR".	Scientific computations	Scientific computations	Scientific computations.
Operating Speeds	3,000 add/sec. goal—50,000/sec.	100 add./sec	7,000–8,000 3-address ops/sec	7,000-8,000 3-address ops/sec.
Circuitry	1,600 vacuum tubes, 3-tube plug-in.	800 tubes, 3,000 diodes	5,000 vacuum tubes. Plug-in packages.	
Automatic Programming	Subroutine Library on Magnetic tape.	Library of Subroutines "Compiling Program for Symbolic Form program".		Built-in Subroutines. Large-scale Compiler.
Publication Date of Source Document.	October 1956	October 1955		January 1956.
Similar Equipment	MIDAC SEAC	IBM-650 Datatron	IBM-704. ERA 1103 A	IBM 704. 1103-A.

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FEBRUARY 3, 1958.

Dr. PAUL KLOPSTEG,
Associate Director for Research, National Science Foundation,
Washington, D. C.

DEAR DR. KLOPSTEG: At the suggestion of Dr. Leon Cohen, I am writing you to give you my opinions on what I consider a very important subject, the future participation of our American universities in the research revolution underway due to the advent of the electronic digital computer—decision maker, calculator, file controller and searcher, theorem prover—many devices rolled into one.

Of all of the research organizations in the country, the universities are most backward in this field. Only one school—M. I. T.—at present has a frontier machine, an IBM type 704. The univacs at Harvard, Chicago, and Case are of a 10-year-old design. Every major aircraft company, every electronics company, every major oil company, every research laboratory down into even the food-processing industry, has better performing equipment available than have even the better universities.

My own university, richer than most because of support from our State legislature, is planning to spend its own funds in acquiring a large machine. This means, of course, that less funds will be available for top-level people to man it.

Other institutions are not so fortunate. Whereas they may be able to find $30,000 a year, $150,000 a year for equipment is not available. The best graduate students in this area, I have noted so far, tend to go into industry just because it is there that the best equipment is available (and the best problems can be attacked). Leadership in this area, both theoretical and experimental, has gone over completely to IBM, Sperry-Rand, and Lincoln Laboratories, among others. The universities are far behind.

A relatively small amount of money, compared to the major sums spent on much less profitable ventures in the long run, could place 20 major, frontier machines in 20 leading universities. It is entirely possible that one of the present (or would-be) manufacturers would manufacture that many copies of a transistorized, extremely fast, large storage machine at near cost, just for the prestige value of such a placement. The universities involved would agree to pay for upkeep (low because designed to be so) and staffing. A group of such mutually compatible machines would allow for enormous strides through interchange of programs and procedures.

Since the British Government (with about one-third the population and even less resources) has supported, according to report, 14 such installations in its universities, this would not be straining our resources. The Soviet effort, which I have been attempting to follow in their own literature, indicates a similar widespread placement of equipment in their universities and technical institutes.

The National Council of the Association for Computing Machinery would be pleased to suggest to you scientists from the ranks of the ACM, who could join others from the IRE, AIEE, and American Mathematical Society in laying plans for such a proposal. I think such a unified approach would have far higher payoff than continued driblets of funds here, there, and everywhere, without any unity of purpose.

An alternative to this proposal is the establishment of even larger machines in geographical centers, interconnected by communications lines to participating institutions. I obviously do not wish to prejudice what would be a technical decision by proposing one plan over another at this time.

Very truly yours,

JOHN W. CARR III,
President, Association for Computing Machinery.

The Use of Soviet Medical Research Information by American Medical Scientists

Saul Herner and Robert S. Meyer

METHODS OF LOCATING OR BECOMING AWARE OF FOREIGN INFORMATION

Thus far, we have limited our discussion to the use made of information on research activities in foreign-language countries, and to the physical form in which this information is obtained. However, another important problem is that of becoming aware of the existence of such information. In order to develop some data on how this is done, each respondent was handed a list of bibliographic tools or techniques and asked which, if any, he had used in the previous 6 months to locate or become aware of information from foreign-language countries. At an earlier stage in the interview, each respondent was handed the same list and asked which tools or techniques he had used in the previous 6 months to locate or become aware of any pertinent scientific information, regardless of language or origin. Thus it was possible to make comparisons which would reveal any significant differences in the bibliographic techniques used to obtain foreign information and information in general.

Perhaps the most striking thing about the tools and methods used to track down foreign information is how few they are in number when compared with the tools and methods used to track down information in general. The average number of different tools or techniques used to track down foreign information was 4.4. The average number of tools or techniques used to track down information in general was 7.6.

Another interesting difference is the fact that indexing and abstracting publications play a far more important role in foreign information than in information in general. Whereas the most-used tool for tracking down information in general was the footnote or cited reference, the most-used tool in the case of foreign information was the indexing and abstracting publication. This relationship was also indicated in the answers to a subsidiary question in which the respondents were asked which of the tools or techniques for locating or becoming aware of pertinent information they considered to be most useful. While indexing and abstracting publications were ranked as the most useful means of tracking down both kinds of information, the proportion of the respondents favoring indexing and abstracting publications over cited references was noticeably greater in the case of foreign information than in the case of information in general. After indexing and abstracting publications and cited references, which were the most important ways of tracking down both kinds of information, personal recommendations ranked third. Then came personal reference files, book reviews, library card catalogs, publishers' advertisements, library acquisition lists, and separate bibliographies.

If one were to attempt to draw conclusions from the foregoing data, it would seem that the most valid statement that could be made is that the approaches to foreign information are somewhat more formal than the approaches to information in general. This is indicated first by the fact that a narrower selection of tools and techniques was apparently used by the respondents to locate or become aware of foreign information. Also, in the case of foreign information, there was a much smaller reliance placed on personal recommendations than in the case of information in general. There was also a smaller use of informal tools or cited references. On the other hand, there was a significantly greater use made of indexing and abstracting publications, whose basic purpose is to put scientists in touch with useful information in a concentrated, well-organized form. The element of chance in learning of useful information, as indicated by the number of respondents who said that they had happened upon a piece of useful information during the previous 6 months, was high in both foreign information and information in general.

FACTORS INFLUENCING THE USE OF FOREIGN-LANGUAGE INFORMATION

The primary factors which appear to govern the use and lack of use of foreign-language information by the scientists surveyed are those of expedience and habit. This fact stood out in the volunteered comments that accompanied the answers to the question on the availability of information from foreign-language countries. Time apparently does not permit the average scientist to cover more than a frac-

tion of the literature that is generally available to him in his field. Therefore, unless a given publication or type of publication has proven productive in the past, the busy scientist is reluctant to experiment with it. Instead, he concentrates on those publications, however few they may be, which have a proven payoff. This attitude often precludes or severely limits the scientist's use of foreign-language information. It could explain the fact that the respondents in the present study exhibited a far greater ability to read foreign-language literature than they did a willingness to do so. It could also explain the apparent tendency to absorb the bulk of their information from foreign-language countries in English.

Actually, the tendency to absorb the bulk of one's scientific information in English, and from a relatively few publications, is not necessarily a symptom of poor scholarship or of research keyed only to expedience. In a study conducted by UNESCO a few years ago, it was found that nearly three-quarters of the world's scientific writings are in the English language. (Cf. Holmstrom, J. E., Research, 4, 190–5, 1954.) If the average scientist could be sure of covering three-quarters of all of the available current information in his field, he would be doing extremely well.

As was suggested in connection with Scandinavian publications, the average scientist is getting a good deal more than mere coverage of pertinent scientific activity in the English-speaking world when he concentrates on English-language articles and papers. Many of the major scientific publications in foreign-language countries besides those of the Scandinavian countries are published in English. Recently, even the Russians have taken to publishing English-language tables of contents and English summaries in their major journals in the medical sciences. Also, many English-language authors refer rather extensively to work done in foreign-language countries. Thus, the American scientist is in a position to get a major portion of his English-language and foreign-language information from essentially the same sources. In this connection, it is interesting to note that the use of foreign-language literature increased with the degree of prolificacy of the respondents as authors.

In addition to forcing the scientist to concentrate on English-language publications, the theme of expedience undoubtedly gives rise to the broad use of indexing and abstracting publications as a means of locating or becoming aware of useful sources of information, and particularly foreign information. Indexing and abstracting publications are proven tools for apprising the average scientist currently and retroactively of pertinent information, regardless of source or origin. On the basis of comments recorded in the present study, the primary shortcomings of indexing and abstracting publications as a compact and expeditious means of keeping scientists abreast of pertinent foreign developments are their slowness and their limited coverage.

In addition to expedience and habit, there appear to be a number of other factors which affect the scientist's use of foreign-language information materially. Mention has already been made of the effect of field of science, as indicated by differences between workers in the clinical and preclinical sciences. Another factor which seems to affect use of foreign-language information is the type of organization or institution in which the scientist is employed. Correlating the places of employment of the respondents with their answers to the question on whether they had read a foreign-language publication in the previous 6 months, it developed that the proportion that had read foreign-language material varied significantly with place of employment. The highest proportion was among respondents employed in industrial organizations. After industrial scientists came those employed in colleges and universities, Government agencies, independent research institutions, and hospitals, in that order. The surprisingly great use of foreign-language information in the industrial segment of the sample is probably explained by the fact that the bulk of the firms surveyed were in the highly competitive pharmaceutical industry, where the careful sifting of foreign information is more an economic expedient than an act of scholarship.

A final factor influencing the use of foreign-language literature is the experience of the respondents as residents in foreign-language countries. This fact emerged from a correlation of the answers to the question on the use of foreign literature during the previous 6 months with the answers to a question of whether any of the respondents had spent a year or more in a foreign-language country. From the correlation, it developed that there was a significantly greater use of foreign-language publications among the respondents who had spent a year or more in a foreign-language country than among those who had not.

Survey and Monograph on the Use of Electronic Computers in the Biological and Medical Sciences [15]

By Prof. Robert S. Ledley

BACKGROUND

The survey and monograph on electronic computers in biology and medicine is an activity of the Medical Sciences Division of the National Academy of Sciences-National Research Council. The Academy-Research Council, a private organization of distinguished scientists dedicated to the furtherance of science and its use for the general welfare, is authorized by the Federal Government to act upon request as an official adviser in all matters of scientific and technical, interest.

More than a year ago representatives of the Air Research and Development Command, United States Air Force, which had a large investment in computer technology, approached the Medical Sciences Division of the National Academy of Sciences-National Research Council with a proposal for a large-scale symposium designed to explore and publicize the applications of computers in biological and medical research. After much consideration and two exploratory meetings, it was agreed that a survey and monograph would serve the purpose better. A contract was written with the Air Force, and Prof. Robert S. Ledley, of George Washington University, was engaged to conduct the study. After 3 months the contract was abruptly canceled for budgetary reasons; however, the work was continued, and support was granted by the National Institutes of Health.

ELECTRONIC COMPUTERS IN BIOLOGY AND MEDICINE

The title of the survey and monograph will be "Electronic Computers in Biology and Medicine." The purpose of the survey is to stimulate the useof computers in biology and medicine. Problems that arise in the biomedical sciences characteristically involve many variables, large masses of data, complicated alternatives. It is just these kinds of problems for which computers are designed. It is therefore believed that some of the most fruitful applications of computers will be made in the biomedical fields, and that a survey and monograph could have a significant influence on the course of medical research by providing biomedical research workers with techniques for evalutaing and employing computers.

A committee of the National Research Council will help guide the survey and examine the results. An ad hoc group of this nature comprising distinguished scientists in various associated fields has already held several meetings. The survey will include past, present, and—most important—furture applications of computers to biology and medicine. It is anticipated that it will stimulate ideas and methods of tackling various problems by means of computers. The survey will be made by traveling and talking to research workers in the various medical research institutions throughout the country.

The monograph will function as a handbook to bridge the technical gap between the biological scientist's knowledge and the knowledge necessary to use computers, and will contain a general description of and introduction to computers.

The first section will attempt to answer such questions as: What are computers? How do computers work? How does one use a computer? How is a problem evaluated to decide whether or not a computer should be used? What kind of computer should be used? How much does it cost to prepare a problem for a computer? How much does it cost to use a computer? What are other economic factors associated with computers?

The second section will be a survey of present, past, and possible future applications of computers to the biomedical sciences. Such a section can stimulate the use of computers by illustrating their range of application and by generating ideas in new techniques and methods for using computers.

The third section will deal with technical, mathematical, and other concepts that are often needed when using computers. One of the greatest barriers for the uninitiated in reading mathematics textbooks is the fact that only rarely does such a book explicitly state the concepts upon which it is based. Therefore, in this section, the attempt will be made to present only mathematical concepts so that the mathematical literature may become more readily accessible to the

[15] Source: National Academy of Sciences, National Research Council, Division of Medical Sciences Washington, D. C.

research worker. This section should aid the research worker in studying mathematics textbooks and finding formulas or other mathematical disciplies which he may need. In addition, it is often important for the research worker to understand the electronic and other mechanisms of which computers are composed. The attempt will be made to present these in simple but rigorous form adequate for the user of computers.

As the monograph takes form and substance, Professor Ledley will be guided by the NAS–NRC Committee on Electronic Computers in Biology and Medicine on its design and content.

VETERANS' ADMINISTRATION.
June 23, 1958.

Hon. ALEXANDER WILEY,
United States Senate, Washington 25, D. C.

DEAR SENATOR WILEY: We in the Veterans' Administration are gratified with your interest in the use of computers to applications other than those in the clerical, defense, and related areas. There is no question but that electronic computers will radically affect all of our thinking and techniques in the medical research program. We are looking forward to doing much that we have never been able to do before.

We are already employing electronic techniques in a small way.

(*a*) There are two small analog computers located at our VA hospitals in Seattle, Washington, and Nashville, Tenn. These hospitals are setting up mathematical models to describe biological processes and are using their analog computers to examine the extent of agreement between the outcome of these processes, as predicted by the models and as indicated by actual observation. This approach, which has been used in various of the physical sciences for many years is considered by many to hold great promise for the future in the biological sciences.

(*b*) A pilot study is underway at the VA hospital, Mount Alto, Washington, D. C., concerning fundamental relations in spatial vector cardiography. This project entails the recording of the heart beat in four dimensions on magnetic tape and permits electronic computers to analyze and interpret such data.

(*c*) The problems and use of tranquilizers led to the development of a cooperative chemotherapy research program in psychiatry among VA hospitals. Thirty-nine hospitals tested the effectiveness of 2 tranquilizers, chlorpromazine and promazine. The electronic-computer facilities of the National Bureau of Standards, Department of Commerce, are being used to assist in the analysis, on a nationwide basis, of the reactions of patients to tranquilizers.

The above studies are indeed small when compared with our present plans to utilize electronics in our medical research programs. We are aggressively applying ourselves to the development of a system utilizing electronic computers which would yield information concerning the dynamics of the medical program based upon data about patients admitted to, discharged from, or remaining in VA hospitals. Involved is the feasibility of maintaining a perpetual inventory of patients; an updated diagnostic cross index; treatment results; long-term care; outpatient care, etc. Electronic techniques will assist our professional staff in their studies of heart disease, mental health, cancer, tuberculosis, and diseases associated with aging.

The data we develop, our findings and conclusions will be of value not only to our veterans but equally to other Government health agencies, and through the medical profession to all humanity.

Following is an excerpt on this subject from a speech I made before the National Rehabilitation Conference of the American Legion on February 28, 1958:

"I shall do all within my power to combine the fabulous facilities at our command in the search for knowledge. Those facilities include the greatest medical program in the history of the world, the magic potential of such facilities as electronic data computers and the exciting actuarial statistics in the largest ordinary life insurance company on this planet where are found many answers involving mortality, involving life, and involving death."

And again in this same speech, speaking on subjects other than medicine, I said:

"That will give you some idea of the vistas opened by electronic data processing. Needless to say, we are getting ready to install this amazing system in our Departments of Insurance and are also looking into the possibility of setting up a computer system in Veterans' Benefits, because we are certain they can improve

service to veterans, insure an almost uncanny degree of accuracy, and at the same time cut our costs."

There is a whole new world opening up in the human sciences and in the forefront of these is medicine. The VA will use the computers on order and more to meet the challenge of this new electronic era.

Sincerely yours,

SUMNER G. WHITTIER, *Administrator.*

Senator HUMPHREY. I shall ask Mr. Reynolds to maintain this transcript on a continuing basis with the pertinent data that comes to our attention, because I should like to have this record of testimony literally enriched with the many items of information that we are able to obtain on the subject matter of science and technology and the role of Government in this field, particularly as it relates to the information aspects.

I believe Senator Martin will agree with me that we might entrust to Mr. Reynolds as the staff director the responsibility of entering into this record whatever items are necessary for rounding it out, not only in terms of the statements of witnesses, but with the proper supporting material. Is that agreeable?

Senator MARTIN. That is agreeable.

Senator HUMPHREY. I believe that concludes the list of witnesses for this morning. We will meet tomorrow morning at 10 o'clock in this same room.

(Thereupon, at 11:25 a. m., the subcommittee was adjourned, to reconvene at 10 a. m., Thursday, June 26, 1958.)

SCIENCE AND TECHNOLOGY ACT OF 1958

THURSDAY, JUNE 26, 1958

UNITED STATES SENATE,
COMMITTEE ON GOVERNMENT OPERATIONS,
SUBCOMMITTEE ON REORGANIZATION,
Washington, D. C.

The subcommittee met, pursuant to adjournment, at 10:30 a. m. in room 357, Senate Office Building, Senator Humphrey (chairman of the subcommittee) presiding.

Present: Senators Humphrey and Martin of Iowa.

Staff members present: Walter L. Reynolds, chief clerk and staff director; Ann M. Grickis, assistant chief clerk, Eli E. Nobleman, and W. E. O'Brien, professional staff members.

Senator HUMPHREY. Mr. Williams, I apologize for keeping you waiting, but I happen to be a member of a conference committee which is on some very important mutual security legislation, important to the welfare of the Nation. It is impossible to be in room F53 of the Capitol and room 357 of the Senate Office Building at the same time, so if I have to depart, or dart in and out of here according to the latest bell and/or phone call, you will know that we are trying to be in 2 places at 1 time.

The Senate is also in session, and I am also supposed to be there this morning. I don't mean perfunctorily there, for I am supposed to be there to handle a bill. I have a special piece of legislation pending in the Senate which has to be passed between now and 5 o'clock this afternoon, so I may have to leave you at any time.

I thought you ought to know what the problem has been, and then let you proceed.

Our first witness is Mr. Walter Williams, Under Secretary of the Department of Commerce, accompanied by Mr. Robert C. Watson, Commissioner of Patents, and Mr. John C. Green, Director of the Office of Technical Services.

Mr. WILLIAMS. Yes, sir.

Senator HUMPHREY. We are surely very honored and pleased to have you gentlemen with us.

Prior to your testimony I should indicate for the record that we have a letter here from the Bureau of the Budget indicating support for S. 4039.

It says that:

> S. 4039 is identical with the draft bill which the National Science Foundation submitted to the Congress following clearance by the Bureau of the Budget.

Dr. Waterman testified in behalf of the bill yesterday and I will make the whole letter a part of the record.

(Letter referred to follows:)

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D. C., June 25, 1958.

Hon. HUBERT H. HUMPHREY,
Chairman, Subcommittee on Government Reorganization,
Committee on Government Operations,
United States Senate, Washington, D. C.

MY DEAR MR. CHAIRMAN: This will acknowledge your request for the views of the Bureau of the Budget on S. 4039, a bill to authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

S. 4039 is identical with the draft bill which the National Science Foundation submitted to the Congress following clearance by the Bureau of the Budget.

Accordingly the Bureau would have no objection to enactment of S. 4039.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

Proceed, Secretary Williams.

STATEMENT OF WALTER WILLIAMS, UNDER SECRETARY OF COMMERCE; ACCOMPANIED BY ROBERT C. WATSON, COMMISSIONER OF PATENTS, DEPARTMENT OF COMMERCE; JOHN C. GREEN, DIRECTOR, OFFICE OF TECHNICAL SERVICES; J. ALLEN OVERTON, JR., DEPUTY GENERAL COUNSEL, DEPARTMENT OF COMMERCE; AND DONALD ANDREWS, CHIEF, RESEARCH AND DEVELOPMENT, DEPARTMENT OF COMMERCE

Mr. WILLIAMS. Thank you, Mr. Chairman.

First of all, with respect to your problems, we respect and understand them and we have been enjoying ourselves here in our relaxation while you have been working.

Senator HUMPHREY. I have not only been working, I have been in a turmoil.

Mr. WILLIAMS. Mr. Chairman and members of the subcommittee, I am happy to have this opportunity to appear for Secretary Weeks in response to your invitation to him. With me this morning are Commissioner Robert C. Watson of the Patent Office and Mr. John C. Green, Director of the Office of Technical Services of the Department of Commerce.

Since this is my first appearance before your group, let me give you a brief outline of my own background. I was born in Iowa but have spent most of my life in the State of Washington. I was graduated from the University of Washington with a degree in chemical engineering. For a short period before World War I, I was a high school instructor. During the war, I served in the Army in the air service and chemical warfare service. After the war, I went into the mortgage banking business in Seattle. In 1927, I became president of the firm, Continental, Inc. In addition to business, some of my other activities included, president of the Seattle Chamber of Commerce, chairman, Washington State Defense Council; member board of trustees and chairman of the committee for economic development. I have been in my present post as Under Secretary of Commerce since 1953.

We appreciate the significance and the usefulness of the testimony regarding our science information requirements which has so far been

developed in these hearings. I have read with interest the copy of the testimony which you forwarded to Secretary Weeks.

Chairman Humphrey, at the opening said:

> In holding these hearings, the committee proposes to proceed on the assumption that existing laws are adequate to permit agencies of the Government operating in this area to provide the necessary facilities and to initiate coordinated Federal programs without the necessity of enacting further enabling legislation.
>
> The subcommittee, in holding these hearings, is proceeding on the assumption that many private and industrial abstracting, translating and research groups can provide most of this type of service to the Federal research programs and scientists in our universities and industries without the necessity of establishing a scientific dissemination service under the control of the Federal Government.

We agree with this basic philosophy. It is apparent, I think from the hearings so far, that while considerable work has been done to improve our science information resources, there are still areas in which improvement is needed. It is important that we remember, however, that the Government is not and under our system, should not be the sole center of activity in the science information field.

All of us are keenly aware of how science affects our day-to-day prosperity and well-being. Science is not the preserve of an isolated community; it is intermeshed in the operations of our Government agencies, the development of our industries, the work of our universities, and the needs of our national defense. The dissemination of scientific and technological information is a function which therefore certainly deserves the thoughtful interest of all of us.

By statute, the Department of Commerce is concerned with the growth and prosperity of our commerce and industry. Science is an important element in this connection. A study conducted by the National Science Foundation has revealed that of the nearly 300,000 manufacturing establishments in the country, roughly 15,000 perform research and development. The others must rely on access to scientific and technical facts to keep abreast of competitive demands created by changing science and technology. We believe that these important needs should not and must not be overlooked.

We have within the Department some of the important science agencies of the Government. These include the National Bureau of Standards, the Weather Bureau, the Coast and Geodetic Survey, and the Patent Office. Congress, in addition, has delegated to us special functions in connection with the dissemination of science information. The Office of Technical Services, within the limits of available staff and appropriation, has the job of carrying out our obligations in this respect. This Office serves as a central clearinghouse from which may be obtained directly and promptly scientific and technical reports put out by various agencies of the Government which engage in scientific research.

There are five Divisions in the Office of Technical Services. One, the Technology Division, is concerned with responsibilities defined in Public Law 776. In general, its operation comprehends the acquisition, cataloging, announcement, and supply of unclassified reports prepared under Government sponsorship. Since the Atomic Energy Commission and the Department of Defense are the major sponsors of research within the Federal establishment, it is with these two agencies that the Office of Technical Services has established its closest working relationships.

Senator HUMPHREY. Could I interrupt along that line, Mr. Williams?

Mr. WILLIAMS. Certainly, sir.

Senator HUMPHREY. Whenever desirous?

Mr. WILLIAMS. Any time.

Senator HUMPHREY. In your observation regarding developing a Technology Division, you say:

> It is concerned with the responsibilities defined in Public Law 776. In general, its operation comprehends the acquisition, cataloging, announcement, and supply of unclassified reports prepared under Government sponsorship.

And you note that the AEC and Department of Defense are agencies of Government interested in research or giving resources to research.

How does this fit in with the role of the Library of Congress? We had the Librarian of Congress, Mr. Mumford here, yesterday, and I thought the Library of Congress was responsible for the acquisition and cataloging of all these unclassified Government documents.

Mr. WILLIAMS. I think, Mr. Chairman, I may, with your permission, cover that fairly well later in the statement; and, if it is agreeable, we can call upon Mr. Green to augment anything that may be omitted.

Senator HUMPHREY. I think that what I will do is to hold all questions until you are through with your statement, and I will mark it as I go along.

Mr. WILLIAMS. All right; thank you very much.

The Office of Technical Services produces a monthly bibliography, titled "United States Government Research Reports," in which each item is organized by subject together with brief information concerning its contents. Instructions on purchase of selected reports are also included.

A complete collection of Office of Technical Services reports is at the Library of Congress and there are several depositories of selected reports in science libraries around the country. These are the John Crerar in Chicago, the Georgia Institute of Technology, Carnegie Tech, at Pittsburgh, Linda Hall at Kansas City, Mo., New York Public Library, University of Cincinnati, and the Detroit Public Library. In the main, our operations are conventional but we have developed two unusual and, we believe, efficient devices for the dissemination of research reports. First, we examine every report acquired to see whether it will be popular or of highly specialized interest. In the former case a suitable stock of the reports is prepared, usually in multilith form.

In the latter case, we announce availability in photocopy or microfilm, depending on the customer's choice. This device insures that copies of every report processed became available but that we do not produce a stock of reports which would sit on the shelves and which would cost substantial sums to prepare. Currently 16 percent of the reports handled are available in multilith form and 84 percent in photographic reproduction. Sales show that the 16 percent of the popular items were purchased in the sum of $250,000 last year and the 84 percent brought in $125,000. These figures are consistent with our original judgment concerning general demand versus specialized demand. I should also note that all photo reproduction is handled by the Library of Congress under our cooperative arrangements.

Our second unusual method of disseminating research reports results from the cooperation and support of the private trade and technical press. When we obtain a report of general interest, a digest is prepared and routed to the magazines which report related materials in their journals. For example, electronics reports are made available to electronics magazines, chemical reports to chemical magazines, and so forth. Because of the wide interest in these materials, the magazines give them excellent space. This method of dissemination is without cost to the Federal Government and greatly increases our audience. As a matter of fact, we have found out that fully half of the demand for the materials can be traced to this type of cooperative publicity.

So far I have been describing our program in the field of unclassified Government research. Beginning on July 1, we will enlarge our scope to include foreign scientific and technical information. The Congress has just approved funds for an operation which will be a clearinghouse for foreign technical information. There has been some criticism of lack of knowledge in United States science and industry of significant developments abroad, particularly in the Soviet bloc. We plan to bring together in an open record suitable information concerning such materials. In general, they will comprehend abstracts, summaries, full translations, and critical reviews. The major sponsor is the Federal Government itself but we hope to receive additional materials from universities, industry, and cooperating foreign governments.

The primary function of the Patent Office is the protection and encouragement of invention by the issuance of patents. An important corollary of this work is the development of means by which patent searches may be made with speed and accuracy. The fine work which the Patent Office has been doing in developing advanced retrieval methods has been described to you to some extent.

The law requires the Commissioner of Patents to maintain a library only for the use of officials of the Patent Office. It has, nevertheless, for many years been available to the public to the fullest extent, including copies of United States patents, foreign patents, and large numbers of scientific and technical periodicals in book form. Thus, while not under obligation to provide the public generally with the scientific and technical information in its library, the United States Patent Office has one of the great scientific libraries of the world and this library is used by the public very extensively.

I might say, just yesterday afternoon, I took a tour through the library and was amazed to find the very extensive and full use lawyers are making there, in availing themselves of the public facilities.

A public search room is maintained which contains approximately 5 million copies of United States patents, including multiple copies used for cross-reference purposes. These patents are arranged with a well-organized classification scheme so that they are grouped in relatively small groups according to subject matter. There are some 50,000 such groups. Approximately 300 researchers visit the Patent Office public search room each day to make searches either on behalf of other persons seeking information or for themselves. Quite a few of these are professional research men employed by firms of attorneys, corporations, or other organizations; however, the full facilities of the search room are available to individual inventors seeking information for

themselves. A staff of advisers employed by the Patent Office is stationed in the search room to advise those who seek information but who are unfamiliar with the Patent Office classification.

The dissemination of this information is greatly facilitated by the proper classification of reference material. The patents and other printed publications which comprise such reference material are constantly being reexamined in the Classification Division of the Patent Office. Where there is a need to do so, the larger classes are broken down and the publications regrouped into smaller subdivisions to facilitate searching. This is a continuing effort because of the steady inflow of published technological and scientific material which makes it necessary to establish new classes and to subdivide classes which become too large for convenient research.

An important effort of the Patent Office to facilitate the examination system is being made in the Office of Research and Development. This effort is directed to the fulfillment of the recommendations of the Secretary's Advisory Committee on Application of Machines to Patent Office Operations headed by Dr. Vannevar Bush. The purpose of this effort is to provide improved means for and better methods of storing and retrieving information. While primarily the effort is being directed to facilitate the work of the patent examiner, who ordinarily spends 60 percent of his time in searching, the objective is not limited in this respect and any progress made accrues to the public and to Government generally. What has been so far accomplished has proved to be highly helpful not only to the Patent Office but to industry and to other patent offices which conduct novelty examinations. At present we are concerned with mechanically searching disclosures in the chemical field. Equipment has been perfected for conducting examinations in the field of steroids. All of the information in some 1,600 patents has been coded and placed under punched cards and a machine devised for rapidly scanning these cards for the answers to questions imposed. This effort has been eminently successful and it is planned now to go forward as rapidly as funds are made available, with the similar codification and fabrication of punched cards for 5,000 additional patents in the chemical field. The savings effected by the work which has already been done are very material and the Patent Office has made available to all interested parties sets of cards such as it uses in its own work of examination.

It may be added that the Patent Office maintains a small staff of translators who translate foreign patents and foreign publications for the benefit of the examining staff.

Upon the request of interested members of the public, translations are made on a fee basis. However, the translation staff is not sufficiently large to accomplish the translation of more than a small portion of the foreign language material which is received in the Patent Office.

Our concern with the dissemination of science information is by no means limited to the needs of the business community alone. We have worked closely with the National Science Foundation, the Library of Congress, and others in seeking improved means for making scientific information readily available wherever it may be needed whether by industry, educational institution, or research organization.

Basically, three general problems have emerged: First, the need for better coordination of dissemination activities; second, the strength-

ening of established services where needed; third, the development of better mechanical retrieval systems. Dr. Waterman has already discussed at length the first of these problems and put before you the proposals of his agency for improvement in this area. In addition Dr. Killian, special assistant to the President, has been giving consideration to our national science needs and he may have some suggestions to make regarding a coordinated science information program.

The Department of Commerce would, of course, be happy to cooperate to the full extent of its resources in any program which may be developed to improve science information programs. We believe that in the National Science Foundation we already have an agency suited to providing for the central planning and coordination which may be required. We feel, however, that we should not and must not lose sight of the important function which has been assigned to us by Congress, namely, to insure that the scientific and technical information is disseminated where needed to business as well as the scientific community.

In considering various proposals for improved coordination by the Government, we should bear in mind that the Government ought to operate in such a way as to help private enterprise rather than to supplant or repress their initiative and the useful programs they have already developed. To the extent that coordination is to be really effective, it ought to be the result of voluntary effort on the part of those concerned rather than an imposition of authority from on top. An outstanding example of voluntary effort directed toward achieving useful coordination is the recent action of leading national abstracting services in banding together to form the National Federation of Science Abstracting and Indexing Services. Here 14 major scientific information groups have joined together to work toward improving their service, the elimination of duplication, and better control of scientific and technical literature.

It isn't difficult to find areas to criticize in connection with the availability of scientific information in some fields. We should not allow this to hide the extremely valuable work which is being done. The state of scientific information in the United States is not entirely unsatisfactory. However, as I said earlier, there is room for improvement and more than likely there will always be room for improvement.

These problems are varied and various solutions will have to be developed to meet the particular needs. We believe it would be highly impractical to attempt to solve all of these problems through large Federal expenditures or to substitute a centralized Federal activity which would replace individual effort geared to particular needs or particular problems. The Government should help and it is doing a considerable amount of work toward helping. The danger of an overexpanded Federal effort, however, might well be to impair the usefulness of non-Government activities in this field. Accordingly, we are opposed to the creation of a new Bureau of Technical Services.

One of the important problems we face is the development of better mechanical retrieval systems. Some work has been done in this field; much more remains to be done. I have already described the work of the Patent Office in this area. In addition, the National

Bureau of Standards Computer Division has been working in this field. I feel confident that given time, the realization of the need for mechanical retrieval systems will lead to the discovery of more useful devices than are now available. It is important, however, that such devices and systems be geared to the actual needs of those for whom the services are intended. Further, I am confident that they will not replace the existing and established services but will be supplemental thereto.

Before closing, I think it important that we realize that the dissemination of science information is not alone the function or activity of organizations dealing with information. The scientific organizations of the Department of Commerce, such as the National Bureau of Standards, the Weather Bureau, the Coast and Geodetic Survey, the Patent Office, and others function not only in the area of doing research but also act to make the results of that research as freely available as possible.

It is our policy and the policy of our agencies to encourage wherever feasible full publication of research activities and to foster the free exchange of scientific information at meetings, conferences, and seminars. We are conscious of the value of scientific information exchange both as producers of such information and as important users of the results of the work of others in fields which are of concern to our agencies. Science information is a part of scientific research and it should not be permitted to be developed as an isolated function unrelated to the purposes which it must serve.

Commissioner Watson, Mr. Green, and I will be happy to answer any questions which you may have.

Thank you very much, Mr. Chairman.

Senator HUMPHREY. Mr. Secretary, that is a very fine statement, very well prepared and exceedingly helpful to us.

Now for just a couple of general questions.

I listened to a number of witnesses at these hearings, as to the functions of the different agencies and bureaus of Government in the field of scientific information, translation, dissemination, storing, abstracting, et cetera. You are describing the work of the Office of Technical Services of the Department of Commerce and the activities of the agencies under your jurisdiction such as the Weather Bureau, the Coast and Geodetic Survey, the National Bureau of Standards, the Patent Office, and so forth.

I can understand that in the Department of Commerce there is coordinated activity.

I suppose, for example, that there is an interchange of information and that there must be some type of central control in the Department of Commerce over these activities.

Let me just pin this down. Does the Office of Technical Services have control over all of the information of the Patent Office, the National Bureau of Standards and——

Mr. WILLIAMS. No. The answer to your question, Mr. Chairman, is that the Office of Technical Services does not. More than any other one place, it is centralized in the Under Secretary, in the Under Secretary's Office.

Senator HUMPHREY. Now, just help me out a little bit here.

You have yourself and these two very fine associates of yours. Let me see if I cannot get to understand this. I put a little more time in

this than the average citizen, and I still do not quite understand who runs the show. I feel that somehow or other it may be somewhat like my family some time ago when my boys were little, they always wanted to know who was boss but now that they have grown up, they know it is their mother.

So, I want to find out who is boss here.

Theoretically the Secretary is the head of all these bureaus, but he is too busy a man to really run the information services; and theoretically the Under Secretary, Mr. Williams, is the boss, but he, too, is too busy to be involved in all the dissemination of general information.

Mr. WILLIAMS. You still want to know who is the mother.

Senator HUMPHREY. I want to know who really runs the show.

What is the duty of the Office of Technical Services, as related to the Patent Office, as related to the Bureau of Standards, the Coast and Geodetic Survey, the Weather Bureau, and so on?

Mr. WILLIAMS. May I give you a blanket answer by saying that your statement that the Secretary is technically in charge is correct. The three agencies, the Patent Office, National Bureau of Standards, and the Coast and Geodetic Survey, are directly under my supervision.

The Office of Technical Services is directly under the supervision, I mean in the policy level, of Mr. Mueller, who is the Assistant Secretary of Commerce for Domestic Affairs.

The Weather Bureau is under the direction of the Under Secretary for Transportation, Louis Rothschild.

We perhaps are both mother and father as a governing body in this respect, that those scientific agencies are directly under me and the other two officers, but we collaborate together on any particular problem that comes up.

In addition to that, Mr. Green is the Director of the Office of Technical Services and is in constant touch with these other ones on all matters that relate and pop up for consideration.

Senator HUMPHREY. Let me be more specific. Do you have a central indexing system in your Department of everything that the Department of Commerce does in the field of scientific literature?

Mr. WILLIAMS. Can you answer that?

Mr. GREEN. Not a complete one, no, sir.

Senator HUMPHREY. You see you people can't possibly sort all the mail that comes in, I can't even in my own office.

Here is somebody from out in Timbuktu, we will say, and they want to know if you have a pamphlet or what you have in the way of information on a subject matter relating to some particular research project that they have read about or heard about or maybe they are engaged in research in a particular item, let's say some chemical research, and want to know what you have in this particular field of endeavor.

Well, how is that handled? Do you have a central card system or where can you check that?

Mr. GREEN. Yes, sir, we do. Those inquiries are handled by our Office. Now, our central card file is restricted to the materials of the Defense Department and Atomic Energy Commission. We will shortly enlarge it to include this foreign information under the new program. We have handled some 55,000 reference inquiries of that nature last year.

Now, we do, within the limitations of staff capacities, where a question comes up such as you have described and may not be answered from that file, we endeavor to go out perhaps to the Naval Research Laboratory, perhaps to the National Bureau of Standards, to other Government experts and see if they can help us out, help us answer this question.

Senator HUMPHREY. Why don't we have a central file system, a card system? Why waste all the time of high-priced people running around looking into whether or not the Naval Research Laboratory has something or the Army has something or somebody else has something? This is all one Government. These are not special little principalities.

Mr. GREEN. All of the questions do not lend themselves to simple card files. Sometimes a man wants information that is right on the edge of science where you have to go to the scientist and say, "What is your latest work?"

Senator HUMPHREY. You say you have the information cataloged from AEC and the Department of Defense?

Mr. GREEN. Yes.

Senator HUMPHREY. That means their publications?

Mr. GREEN. Reports.

Senator HUMPHREY. Their bulletins, their scientific papers that have been developed; is that right?

Mr. GREEN. Yes, sir.

Senator HUMPHREY. Does the Library of Congress also have that?

Mr. GREEN. We have a complete collection. As Mr. Williams stated, we put it at the Library of Congress——

Senator HUMPHREY. Do they also have a card file on it?

Mr. GREEN. No, they no not.

Senator HUMPHREY. They do not?

Mr. GREEN. No. They are trying, with our help, to assemble one now, but they do not have a complete file at the moment. This again is a question of resources. I think the Library would like to have one. I think it would be a good idea for them to have one but they don't have one at the moment.

Senator HUMPHREY. What do they do with the material that you send over? Where do they put it? How do they know where they put it away?

Mr. GREEN. Yes, sir, it is put away according to our catalog number and we announce it is available from them. Eighty-four percent of the reports that we announce to science and industry are supplied exclusively by the Library of Congress.

What happens is that our journal, here, says: "This report," which is briefly described, "may be obtained at a certain price if you ask for it by this catalog number."

The Library photo duplicates, in its photo-duplication division, that report off its shelves, makes a photocopy and mails it directly to the customer.

At this moment I believe I am right in saying that conservatively 30 percent of the total photo-duplication work of the Library of Congress is the sale of reports to science and industry based on our announcement service. We are fundamentally an information service. We bridge the gap between the Library, shall we say, and the scientific and engineering customer.

Senator HUMPHREY. You are the broker, so to speak, between the customer and the supplier?

Mr. GREEN. Yes, sir. In many respects we are like a chemical abstract or biological abstract information service.

Senator HUMPHREY. I want you to understand clearly that I am not being critical, I am just trying to ascertain what procedure is followed.

There are so many agencies of Government that are collecting materials and developing bibliographies and card indexes, all the identification that is necessary to keep track of that material, and I never have been able to quite find out whether each one knows what the other one is doing.

Mr. GREEN. We began our cooperation with the Library of Congress 13 years ago when we were assigned to the job of going to Germany and bringing back all of that German information.

I sat down with the Librarian at that time and worked out this cooperation which we have refined over the years, and we think it works very effectively. The scientific customers seem to like it, too.

Senator HUMPHREY. Are you responsible for all of the research information of the Department of Defense? I know you have it, but are you responsible for it under law or under regulations, under Executive order, whatever it is, for correlating, disseminating, translating, listing, et cetera, and indexing the work of the Department of Defense and AEC?

Mr. GREEN. We have a very broad law which we have interpreted as a law to cooperate with any voluntary coordination such as has been discussed here with those agencies. AEC and Defense serve their own organizations and their own research contractors; we supplement their work and serve the general public here and abroad. We dovetail, we don't take over.

Mr. Huff yesterday mentioned the Armed Services Technical Information Agency. We are parallel with them.

Senator HUMPHREY. What do they do that you don't do?

Mr. GREEN. They handle classified material, for one thing.

Senator HUMPHREY. Nobody can get hold of very much of that.

Mr. GREEN. They serve the Military Establishment. We serve the taxpayer who is not a part of the Military Establishment.

Senator HUMPHREY. Does the Armed Services Technical Information Agency serve the public in any way?

Mr. GREEN. No, sir. It serves them through us. As a matter of fact I think Mr. Huff said that yesterday in his statement.

Senator HUMPHREY. I am sure this works, but I must say it is something like a Rube Goldberg development.

Mr. GREEN. Well, it is proof that voluntary coordination has been going on within the National Science Foundation, within the Central Intelligence Agency, within the Library of Congress, within the Department of Defense, and so on, and it does work.

Senator HUMPHREY. I won't take up too much more time on this, but I do not quite see what the Office of Technical Services does that is not being done by somebody else.

Mr. GREEN. Well, as a matter of fact we lean on the services of other people and we use their services and pick up their products and feed it out.

Senator HUMPHREY. Why don't they do that themselves? For example, why shouldn't the American people be told in bold announcement, day after day, "If you want any research information about anything, the Library of Congress has it."

I mean, here is a library, the Library of Congress, with its depositories, and its many branches and all its contacts. Why shouldn't it serve the American people? For example, a man out in my part of the world who might want to get something on atomic energy? Actually, today he wouldn't think of calling on you fellows. If he were a businessman and in contact with the Department of Commerce, he would do one of two things—he would write to the Atomic Energy Commission or write to his Congressman, and I believe he would most likely write to his Congressman.

Mr. GREEN. I would say the answer to your question, sir, is that in 1945, when President Truman signed the Executive order which assigned this job to the Department of Commerce, he did it on the theory that the user of this information is industry, and that the Department of Commerce is the proper link to industry, through its trade association, through its trade press and all of its contacts across the country with industry and that is why I go back to my statement: We reach the user, we link the Library to the user and that is primarily industry, large, medium, and small.

Senator HUMPHREY. I see the role that you can fill. In a sense it seems to me it is a role of expediting the use of the material that is available. But in all of this, this word "voluntary" is a precious word in the American vocabulary. Sometimes, however, it is also used as a word for inaction, and what I am worried about is whether or not these voluntary arrangements will work out so good, particularly when they are working with the Department of Defense and with the AEC, because they don't always want to be as cooperative as people want them to be.

There are just so many different groups included that frankly I personally don't know what to do when people ask me to get material on a particular subject matter relating to any item of information. I can think of a dozen places I might turn to, more than one place I can go. It's just exactly like going out to the airport. If you really want to get any information about airline travel schedules, you have to go to each airline. In this modern great airline system they do not have a combined office. You have to go to each.

Railroads are often criticised, but at least they have an information service for all the railroads where you can find out something about them. They know when the trains are supposed to go and where they will go. But if you want to find out about planes, you go to Northwestern, American, United, TWA, unless you can find some poor soul who isn't too busy at one of those counters and is willing to take the catalog and look through the pages, because he is working for TWA, say, and you are asking about Alleghany.

What I want to know is—do we have a combined catalog or do we have somebody who is hard at work on developing a combined catalog, who is delighted when people ask questions of any and all other departments? Or do we have people in the Department who would say, "I really work for the Department of Commerce, but if you insist, you are taxpayers and I will look to see if they have something in the

Library of Congress, or look and see if they have something in the Department."

What I am looking for are those who would be loyal to the job of centralization of the information.

Mr. GREEN. I assure you we have the loyalty for the job. We have 90 percent of the information centralized, because 90 percent of the research is done by Defense and Atomic Energy Commission, so we have 90 percent of the product ourselves.

Mr. WILLIAMS. Mr. Green, is not an answer to the question the chairman is raising as to where to go, to simply have them refer to the Office of Technical Services?

Mr. GREEN. Yes, 55,000 people did last year.

Senator HUMPHREY. I bet another 150,000 didn't know where that was.

Mr. WILLIAMS. Perhaps they could have been referred to the Office of Technical Services, because there is machinery——

Senator HUMPHREY. I have a letter, for example—the Librarian of Congress tells me in no uncertain terms, "If you want information, you come to the Library of Congress," and he repeated it yesterday. We had Dr. Waterman up here and he said, "Look, we are going to coordinate this whole thing." That apparently means somebody is going to ride the herd, but the question is, who?

Coordination is a nice word for getting work done with a carrot instead of a stick, but the stick ought to be there, so somebody can run it.

Then, we had some other people in here suggesting we set up a brand new type of coordinating agency and they were going to run it.

Now, we have this group of 14 abstract services and they are going to run it and the National Academy of Sciences said they can do it.

Who runs it? In the lines of the politician, who runs the store?

Mr. GREEN. Well sir, the Congress, the 81st Congress gave us a very specific job and that is to establish and maintain within the Department of Commerce a clearinghouse for collection and dissemination of scientific, technical, and engineering information. This is a job we were assigned.

Senator HUMPHREY. I appreciate that, and when I look at the charts that we have in this committee on the organization of the executive branch, it would be my feeling as a Member of Congress that I should go to you because, by the nature of your office, a technical office in the Department of Commerce, the description of the job of that office plus the statute that establishes the duties, I would say—here is the place to go to.

Now the question is, regardless of whose fault it is, and most likely it is the fault of the Congress, we generally end up getting some of the blame, but regardless of who is responsible, have you been able to be the full coordinating agency for all of the research information?

Mr. GREEN. Sir, may I say that we have no intention of being a coordination agency but a clearinghouse.

Senator HUMPHREY. What does the language say?

Mr. GREEN. The language is, "to establish a clearinghouse for collection and dissemination of scientific, technical, and engineering information."

Senator HUMPHREY. What do you mean by "clearinghouse"?

Mr. GREEN. This is a place where you can come and learn about unclassified information.

Now, because of our belief that we should not do work that is being done elsewhere, we have restricted this function to Government research and within the field of Government research——

Senator HUMPHREY. Is that what the statute says?

Mr. GREEN. The statute is a very broad statute.

Senator HUMPHREY. Read the statute again.

Did it say just the Department of Defense and AEC, because you recall it specifically says AEC should set up a big library.

Mr. GREEN. I should have gone on and said—to this end, to take such steps as he may deem necessary and desirable, and the "he" being the Secretary of Commerce.

Senator HUMPHREY. As I understood the authority in that statute, you were to be the clearinghouse for all, isn't the word "all" in there?

Mr. GREEN. "Clearinghouse for the collection and dissemination of scientific, technical, and engineering," no, sir, not "all."

Senator HUMPHREY. Clearinghouse for the——

Mr. GREEN. Scientific, technical, and engineering.

Senator HUMPHREY. But you have restricted this, under the Secretary's or the Department's interpretation, to be basically Defense and AEC?

Mr. GREEN. Staff limitations have restricted it.

Senator HUMPHREY. I understand. I am sure, Mr. Green, that you are a devoted, dedicated, and extremely able public servant, I know you are.

Mr. GREEN. Thank you, sir.

Senator HUMPHREY. I want to pay you tribute. I am not trying to say that you do not do your job. I think you have done an excellent job.

What I am trying to find out is where should we help and how should we help. Every time we have somebody here to testify, they have a program and it is always all very interesting, very good, and I think we are all sympathetic. I personally feel a share of blame for not having done all that needs to be done. I didn't know about it, but ignorance is no excuse.

What I am trying to find out now is how do we repair the limitations that we have placed either through lack of action or express limitations on authority? Who runs it? Do you think that you can work under a program with the National Science Foundation, who is responsible, as the clearinghouse?

Mr. GREEN. As the coordinating agency.

Senator HUMPHREY. What is the difference between coordinating agency and clearinghouse?

Mr. GREEN. Coordinating agency, as we view it is an agency that broadly encourages people to work together to avoid overlapping, duplication, and things of that sort.

A clearinghouse today is an operation, a place where you come and get the answer to questions—a service agency.

Senator HUMPHREY. I think that normally the clearinghouse idea is excellent, and I want you to clear the whole house. I think the trouble is, you are sort of working in the library and parlor but have not gotten down yet to the recreation room or to the rest of the house.

You don't have a centralized index of each and all of the publications that are supposed to be available.

Mr. GREEN. We are working toward that.

Senator HUMPHREY. Do you need more money?

Mr. GREEN. Yes, sir.

Senator HUMPHREY. Do you really need more men and money?

Mr. GREEN. The Bureau of the Budget has authorized, not me, to make that statement. We have received funds as you know from the Congress to do a substantial program in Soviet-bloc information. Perhaps it will be four times the size of the money we have on domestic work.

Senator HUMPHREY. I asked you a specific question. You have a mandate from Congress, the 81st Congress, and if any citizen will read that particular statute, that is one that people can understand. I will say that is rather unique, really, to be able to understand it, some ordinary good citizen must have written that statute, without having it all mixed up by the technicians.

If someone were to read that out in Wyoming or Minnesota or Ohio or someplace, would they be able to say, "I know where to go for the research, go to the Office of Technical Services; right there, the Congress says so."

Do you have the staff at present to be able to be "the" clearinghouse for what the Congress said you were supposed to do?

Mr. GREEN. We have the nucleus.

Senator HUMPHREY. I didn't ask you that. Do you have the staff; the necessary staff?

Mr. GREEN. In my opinion, and it is my personal opinion, we do not.

Senator HUMPHREY. Are you making requests through the Department, for the necessary improvements in staff?

In other words, are you requesting for your office, through your superior, adequate funds in the next year's budget or supplementals, to give you the staff that you need?

Mr. GREEN. We have not prepared that next year's budget, sir.

Senator HUMPHREY. You have not?

Mr. GREEN. Not next year's budget.

Senator HUMPHREY. You will be preparing that this fall?

Mr. GREEN. This fall; yes, sir.

Senator HUMPHREY. And I imagine you are thinking about it.

Mr. GREEN. I am hoping Mr. Williams is listening.

Senator HUMPHREY. I am sure he is. He is a very attentive man.

Now, am I correctly informed that the other body, the House, sharply cut your budget this year?

Mr. GREEN. The situation was this: We requested a program to make the Soviet-bloc material available. We asked $860,000. We were allocated $300,000 by the House. We went to the Senate on appeal, they allocated us $750,000; in conference, the figure came out at $510,000. We think we will give you a first-class program with that.

Senator HUMPHREY. You believe this will be adequate?

Mr. GREEN. We think we needed $860,000, but we think we can still do a good job on $510,000.

Senator HUMPHREY. In other words you plan to come back again.

Mr. GREEN. I had rather——

Senator HUMPHREY. We are delighted to see you here.

I am pleased that you have moved on this as much as you have.

Now, as I understand, this is to catch up on some work of cataloging and indexing?

Mr. GREEN. And announcing.

Senator HUMPHREY. Making available to the public the materials translated from Soviet journals as well as materials that were just acquired and printed in English.

Mr. GREEN. That's right.

Senator HUMPHREY. You have a pretty good program mapped out.

Mr. GREEN. We believe so.

Senator HUMPHREY. Are you the one that would handle all that material?

Mr. GREEN. Yes, sir. This will really be a clearinghouse.

Senator HUMPHREY. You will be "the" clearinghouse on this one?

Mr. GREEN. Yes, sir.

Senator HUMPHREY. Now, if somebody wrote to the Library of Congress about it, they would know also what to do about it?

Mr. GREEN. They would know; yes, sir.

Senator HUMPHREY. Would the document be in the possession of the Library of Congress or the Office of Technical Services?

Mr. GREEN. We will continue to keep a complete collection at the Library of Congress. They will make photocopies for us; they have done so.

Senator HUMPHREY. They are the depository?

Mr. GREEN. They are the depository.

Senator HUMPHREY. You don't have a depository in a physical sense under your jurisdiction?

Mr. GREEN. We don't want a depository.

Senator HUMPHREY. I am trying to develop this for the record.

The same thing is true, is it not, with AEC and the Department of Defense?

Mr. GREEN. Yes.

Senator HUMPHREY. And CIA?

Mr. GREEN. And CIA.

Senator HUMPHREY. The depository for those documents is either in their department, at the library, or in the Library of Congress; is that correct?

Mr. GREEN. Quite so.

Senator HUMPHREY. What you are attempting to do is get on top of this mass of material, get it cataloged and indexed with, I hope, some duplicate cards in the respective agencies that serve people.

Is that right?

Mr. GREEN. Exactly so, and I wish you had said "announce and distribute."

Senator HUMPHREY. Announce and distribute?

Mr. GREEN. Because if you don't get that done, you really haven't accomplished anything.

Senator HUMPHREY. Are you in consultation with the National Science Foundation?

Mr. GREEN. Every day, sir.

Senator HUMPHREY. Have you talked with Dr. Waterman about these problems?

Mr. GREEN. Yes, sir; I have.

Senator HUMPHREY. We heard the testimony yesterday, and you indicated, I believe, Mr. Williams, today, you supported the idea of the National Science Foundation being a coordinating body for this whole subject matter of technical and scientific data; is that right?

Mr. WILLIAMS. That is right.

Senator HUMPHREY. And, as I understand it, this is coming into sharp focus in the last few months where the National Science Foundation is beginning to work into this field acting as a coordinating group, is that your understanding?

Mr. WILLIAMS. Yes.

Senator HUMPHREY. Is there anybody here from the National Science Foundation this morning?

Dr. ADKINSON. Yes, Senator.

(Testimony of Mr. Williams momentarily interrupted for a question, directed by the chairman, to Dr. Burton W. Adkinson, National Science Foundation.)

Senator HUMPHREY. Has there been more activity on the part of the National Science Foundation as a coordinating body in this whole field of technical and scientific data?

Dr. ADKINSON. Yes, sir, and we expect to expand it considerably.

Senator HUMPHREY. Have you set up any formalized basis for working with the Office of Technical Services, or do you just rely on the fact that you get together once in a while?

Dr. ADKINSON. We have been relying greatly on informal conferences. We are organizing an advisory committee, as announced by Dr. Waterman yesterday, and a series of panels to consider specific problems. These will be formal committees. The informal conferences will continue. Also there is an interdepartmental committee.

Senator HUMPHREY. It is growing.

Dr. ADKINSON. We are working now on the foreign science problem.

Senator HUMPHREY. Dr. Adkinson, will that interdepartmental committee be coordinated with the National Science Foundation's work as the coordinating body?

Dr. ADKINSON. I hope so; I am chairman.

Senator HUMPHREY. Good. I wanted to make sure.

You see, we can't rely on these informal conferences. They are delightful, wonderful as long as the government is small and as long as everybody stays in the job and you do not have any new ones coming in.

However, there is a great migration in Washington, in and out, emigration and immigration, and I think you have to have a formalized pattern if you are going to make possible coordination that would provide the type of information for the clearinghouse activity upon which you, sir, are concentrating your attention. Otherwise you are going to have to have several clearinghouses and that is what I am trying to get under control here, at least in my own thinking, so that when I leave the room I can say, we are now underway with a coordinating agency—the National Science Foundation. They are establishing a formalized advisory group that will meet regularly, and its distinct functions are to be performed with panels in certain areas of endeavor in the scientific and professional field. All of this is designed to make possible a fulfillment of the statute of the 81st Congress so that the Office of Technical Services actually would be

a clearinghouse and that the Library of Congress is not in competition with some other department or agency, or vice versa.

Just like all things in America, we are tremendously rich, very powerful, with almost unbelievable resources but we never quite get down to really organizing them, you know, putting them in proper order or focusing them on specific jobs.

What we want to know now is, do you feel that we are on the way in this field today?

STATEMENTS OF MR. WILLIAMS, MR. WATSON, AND MR. GREEN—Resumed

Mr. GREEN. Yes, sir; I do.

Senator HUMPHREY. One other question about this research in electronics and this retrieval system.

You feel, Mr. Williams, that this will be helpful to your operation?

Mr. WILLIAMS. Yes. As was pointed out in the statement, there is a record now of achievement in the steroid field and there is no reason to doubt that it won't be just as successful as we now move on into other fields.

If you would like, Mr. Watson, Commissioner of Patents, will elaborate on that, as he is saturated with it.

Senator HUMPHREY. Please do.

Mr. WATSON. Mr. Chairman, I have with me Mr. Don Andrews, who is our Chief of Research and Development, who can answer any specific questions.

I may say that Dr. Vannevar Bush's committee filed an extensive report recommending the program which has been engaged upon by the Patent Office in its endeavor to mechanize the searching operation, and I would like to submit for the use of the committee a copy of that report which was rendered in 1954 and which contains a great deal of information about the Patent Office Library and Patent Office problems as well as the committee recommendations, the recommendations of the rather large committee, of procedures to be followed to relieve the duties of the examiner who spends so much of his time in the manual operation of searching.

Upon that recommendation we organized our Office of Research and Development which, for the first time in the history of the Patent Office, is now generating original information instead of merely processing the information submitted to us by others.

The chemical field of research, the chemical art, seemed to offer the greatest opportunity to mechanize, and we engaged in the operation of attempting to mechanize the search operation in the most logical field of the chemical art, the steroids to which Mr. Williams has already made reference.

We have succeeded in coding some fifteen or sixteen hundred patents and placing the information, every bit of information which is contained in those disclosures, upon cards and in devising a machine which, in a way, is in the nature of an electronic machine, so that a search may be made now in a matter of minutes when before it was a matter of a day or day and a half or 2 days effort of a skilled examiner. We now have in operation an examining division in which the search the mechanical searching operation, is performed on a day-by-day basis.

Senator HUMPHREY. Is that just in your office?

Mr. WATSON. That is in the Patent Office.

Senator HUMPHREY. That would relate to the materials that you have on chemicals within the Patent Office?

Mr. WATSON. Yes. Now, we have an enlarged program. There are some 300,000 chemical patents and the total number of patents which have been issued are two million eight hundred thousand or nine hundred thousand, so that we have a very great task ahead of us, but the progress which we have made in the first instance has been very encouraging. Industry has approved it. We have sold over 50 sets of our cards to industry and industry is using them in their searching in the steroid art.

I was recently in Stockholm, Sweden, and I found the Swedish Patent Office had purchased a set of those cards and was using them currently. We now propose to go forward with the coding of 5,000 additional patents in the chemical field. We know how to do it. It has been done in part, and we will proceed to do it as rapidly as we can.

We are not neglecting the other fields of search. We are endeavoring to determine how a machine may be applied to the searching of patents for machines, patents for processes, patents for structures, composition of matter and articles of manufacture such as are contemplated by the patent statutes.

We are cooperating with industry in those respects, and certain groups of industrialists have appropriated money to supplement our effort by searching those disclosures which are not to be found in patents but are in periodicals and books. They will supply us with the information thus obtained and we will place that information on cards so that eventually in the steroid art and eventually in the chemical field the machine will search not only patents but all disclosures. The Patent Office is charged with the duty of knowing, you might say, everything that ever happens by way of a published contribution to the arts, in the nature of a machine, process, composition or matter or the like such as the Patent Office is authorized to consider for the purposes of granting patents.

That is a rather large contract and I do not know when it may be completed, but we are encouraged by the progress which has been made and we believe that the problem will eventually be solved.

Senator HUMPHREY. You speak of the machines that you are developing, Commissioner. I'm sure that you realize that Members of Congress have long been proud of the work of the Patent Office. You, sir, as Commissioner, are highly respected. When we speak of these machines that are being developed under your supervision and direction, I was wondering, are these machines adaptable for other types of information? You have a machine, for example, for chemical patents in the Patent Office. Could that machine be used over in the Library of Congress to retrieve and find other materials or chemicals?

Mr. WATSON. I'm not certain. I think that the system, the coding systems which we have developed, could be successfully employed in the coding of information other than that which is contained in patents, because I believe that our problem is the hardest of all. I forgot to tell you that the work which has been accomplished, and the work which is being now done, and that which is contemplated, is in

conjunction with the National Bureau of Standards. We receive an appropriation for this work, and a considerable portion of that is given to the Bureau of Standards which then make contracts with others, all looking toward the solution to this problem, and there is at the Bureau of Standards, of course, electronic machinery and other facilities which are unavailable in the Patent Office.

We have also collaborated with the Bureau of the Census and have given them funds and received from them technical advice and service, particularly in the design and construction of the machine which we are now using. The machine which we are now using is a standard machine, slightly modified. It is an International Business Machine, a card-sorting machine. It may be that in the future, that type of machine will not be used. It may be a much more rapid type of machine of the electronic type with wires, tapes, and so on. We are feeling our way, but we do feel encouraged by the progress which we have made.

Senator HUMPHREY. Are you familiar with the studies that have been made in this matter of retrieving machines and electronic equipment by Western Reserve University?

Mr. WATSON. Yes, not in detail, but Mr. Andrews here is completely familiar with that subject.

Senator HUMPHREY. Your position, Mr. Andrews, is what?

Mr. ANDREWS. My name is Donald Andrews. I am Director of the Office of Research and Development, United States Patent Office.

Senator HUMPHREY. Now, we have Mr. Adkinson here, who is with the National Science Foundation, and I am trying to put together the picture here and go one step further.

Mr. Kent is here also, from Western Reserve University. So here we have the picture, as I see it, developed.

The National Science Foundation is to be the coordinating group; the clearinghouse is the Office of Technical Services, by statute and by desire and design. Over here is the Patent Office that has a particular role to perform in terms of the congressional mandate and the tradition and the history of the Patent Office. The Patent Office is trying to modernize, as I understand it, its retrieving service, finding the reports in one area on the steroids or chemicals, right?

Mr. WATSON. That is right.

Senator HUMPHREY. Now, we are at that point. You, in the process of developing new equipment, get an appropriation. That appropriation is extended in part through the National Bureau of Standards in their Research Division on these electronic devices for the purpose of retrieving information. Is that correct?

Mr. WATSON. That is right.

Senator HUMPHREY. Now, we come back again to the National Science Foundation. Does the National Science Foundation as a coordinating group have in mind an overall program of mechanization of electronics that it would design and lay down in broad outlines, in more or less asking the Patent Office, the Office of Technical Services, and others, to farm out and get the job done?

What about that, Dr. Adkinson?

(Testimony of Mr. Watson momentarily interrupted for a question, directed by the chairman, to Dr. Burton W. Adkinson, National Science Foundation.)

Dr. ADKINSON. It would be very nice if we could do that, sir. I would like to see it done. But we must remember that in its work with these electronic machines, the Patent Office has applied a particular machine to a particular problem—steroid compounds and chemical compounds. That doesn't necessarily mean that this machine is adaptable to other types of literature.

Senator HUMPHREY. I realize that. I didn't make myself clear. I think that specialization here is a highly important thing.

Dr. ADKINSON. What we are setting up is an arrangement whereby the Bureau of Standards will be the clearinghouse and research advisory body on machine work within the Federal Government. Then, any agency that is interested in this field can go to that clearinghouse to find out what is being done and to obtain advice on its problem. This plan is under negotiation at the present time with the Bureau of Standards.

Senator HUMPHREY. What I'm trying to find out is, has the National Science Foundation put under its wings, so to speak, or under its broad area of jurisdiction as one of the areas of its concern and its study and development this whole matter of mechanization of retrieving and finding information, and thereby finding the proper place here in the Government to expedite that under the general order of the National Science Foundation?

Dr. ADKINSON. Yes, sir. We think that this clearinghouse and advisory body will improve the machine research that is going on in the various Government agencies. Each has its own specific problems.

Senator HUMPHREY. What about getting those together?

Dr. ADKINSON. We hope that by informing these agencies not only of research and development on machines in each but of similar work contracted to outside organizations, coordination will be achieved.

Let me illustrate how this system will work. Suppose a defense agency is interested in mechanizing its information activities. It may turn to GE or to RCA or to Western Reserve, or to Documentation, Inc. The Bureau of Standards will know about this work and also will be informed on similar efforts by other agencies. In this way I think we'll achieve coordination without curtailing the initiative either of private industry or of Government agencies. We are in the very early stages of the use of machines in information work and we must explore all ideas that seem to have any merit. We cannot just stop at one that works in a particular application. We think this plan will achieve coordination and keep each one informed on what all the others are doing. That is the coordination function of a clearinghouse.

Senator HUMPHREY. Would a man like Mr. Andrews here, in the Patent Office, be in touch with and in contact with the National Bureau of Standards?

Mr. ANDREWS. Yes, we are presently closely working with the Bureau of Standards.

Dr. ADKINSON. In fact, the reason the Bureau of Standards was approached is that it has a unit which many of the Government agencies are calling on now for advice. At the present time neither sufficient staff nor technical equipment are available, so we are exploring with them ways to get sufficient funds to get both staff and facilities this year.

Senator HUMPHREY. I thought we would kind of tie this together as we go along. I hope you'll forgive me for the informality of this discussion. It gets me in shape to understand what the Commissioner has in mind and what Mr. Andrews is doing.

STATEMENT OF MR. WATSON—Resumed

Mr. WATSON. We have talked with Dr. Adkinson on various occasions, and Mr. Andrews has been working with him, and I'm in complete accord with the thought that the National Science Foundation shall provide the service which is proposed. I think it is to our advantage.

Senator HUMPHREY. Thank you very much.

Senator Martin, I apologize. I got going on this thing and I wanted to kind of tie it up, for my own personal satisfaction and understanding.

Senator MARTIN. I understand your work, and I have been listening very interestedly.

My question is whether we are in agreement on the coordinating agency that is being set up in the National Science Foundation or in a separate department, as set out in part I of this bill before us? If that is done, created by this legislation, the bill proposes a transfer of many of these agencies' activities over to this proposed department. My question is, Is that type of reorganization of the whole program in keeping with your views?

Mr. WILLIAMS. We don't believe it is either necessary or desirable to depart from the existing kind of machinery that we have, and to emphasize something that we have been talking about now for the last half hour or so, we fully believe in the role of the National Science Foundation as the coordinator. But I think it ought to be emphasized, too, that the role of the Department of Commerce with the Office of Technical Services as set up by statute, clearly gives responsibility to us for the dissemination of the information. That is distinctly different from the coordination, as we see it.

Senator MARTIN. It is not necessary to transfer the Office of Technical Services over to this agency at all? It is not necessary to transfer to a new department of the Government as set out in this bill?

Mr. WILLIAMS. We think not, because it stems back to the purposes of this bill when this bill was passed in 1950. It relates closely to the business and industry and stimulating of activities in the business world.

Senator MARTIN. All items as well as classified items in the Defense Department should logically be placed where they are now?

Mr. WILLIAMS. We think so.

Senator MARTIN. The coordinating agency, from your statement, would probably be an agency that devotes itself only to coordinating efforts, as between existing agencies where they are now placed, that is, where they are now situated? You would leave the OTS with the Department of Commerce, and all the other agencies as they are now functioning, and they would look to this coordinating agency only as a sort of overseer rather than as an administrator of these various programs. Is that correct?

Mr. WILLIAMS. Yes; I think that will be our opinion, but to restate what we said a moment ago, we do draw a distinction between this coordination function and the dissemination function.

Senator MARTIN. Yes; that raises another question in my mind on the clearinghouse program. That could be considered a separate function from the coordinating function and could be separated from it, not necessarily put them all in one department of the Government?

Mr. WILLIAMS. We see no particular gain from doing that, and we see a good bit of gain by leaving it where you have the dissemination left with the organization that has the duty of strengthening business and commerce.

Senator MARTIN. And this agency can be spread into different fields? It wouldn't have to be placed in one tight little organization of its own?

Mr. WILLIAMS. No, as indicated earlier in the testimony, that department of the Office of Technical Services is being expanded now. I believe the personnel is being just about doubled, isn't it, by virtue of the new appropriation, so that it can be expanded to accommodate whatever the needs seem to be?

Senator MARTIN. In this clearinghouse work?

Mr. WILLIAMS. Yes.

Senator MARTIN. That raises a question, of course, whether it can all be done in the Office of Technical Services, or whether it should be carried on in different agencies such as the Library of Congress or other places, possibly. What is your view about the clearinghouse function? Should that be centralized into one spot where a Congressman or Senator can say, now, I'll push this button and get the answer from one central spot, or should we have the present functioning spread to different places such as your OTS and the Library of Congress facility?

Mr. WILLIAMS. Of course, the Congress can change its mind, but Congress has given the Department of Commerce that specific assignment as the record stands now.

Senator MARTIN. Yes, and in the plan that we have here in this bill, as far as coordinating is concerned, the bill provides a very strong centralization under a new department and transferring agencies over to it. That, I think, is unnecessary and——

Mr. WILLIAMS. As we said a little while ago, Senator Martin, we believe that it is not only unnecessary but undesirable, because we would then throw away the very premise arrived at when this assignment was first made—that is, to tie these operations with business and commerce and trade.

Senator MARTIN. Before we bring this bill, S. 3126, before the Senate for consideration, you would hope then, that we would do a bit of revising on the bill?

Mr. WILLIAMS. To say—well, the answer is "Yes."

Senator MARTIN. I have listened here this morning with great interest to the discussion. I think it is very informative in getting a general view of the entire matter. These hearings raise a few questions in my mind as to what we should do in the way of revising the proposed legislation. That is particularly our job, and we are supposed to understand better than I know at the present writing what our main objective is and how to get there. We need complete understanding up here before we attempt to present legislation to the

Senate for their consideration. I do not want to join in a move that may be challenged as unworkable and unwise, and yet I want to help the whole program in the way it should be helped. That is the reason for my questions.

I'm still a little bit confused about whether we are going to centralize the clearinghouse function as definitely as the coordinating function. Are we going to look to one clearinghouse to put us in touch with all the various other clearinghouses, or are we going to look to the various individual clearinghouses that have grown up——

Mr. WILLIAMS. I would think the answer would be yes, we would look to one. But I would like Mr. Green to use his words and his experience in this field to give you his view.

Senator HUMPHREY. Could I interrupt a minute, Senator Martin?

Senator MARTIN. Yes.

Senator HUMPHREY. When we speak of "clearinghouse," I want to know if we are thinking in the same terms. Clearinghouse does not necessarily mean a central working office or a depository, but it is a central information office. Is that the way you understand it?

Mr. GREEN. Precisely so. This was the statement that I was going to make, Senator, that it seems to me this Government clearinghouse should not take over existing activities. It should know about them and know how to lead people to them so that they could made the maximum use of existing capacities.

Senator MARTIN. The clearinghouse you have in mind would not in any way attempt to merge or take over these functions, but leave them where they are and know where they are, and what they have done, and be able to direct anyone to the proper spot. It is not in any sense of the word a depository or a centralization of the various clearinghouse functions that are in these different agencies that now exist· is that correct?

Mr. GREEN. Yes, sir.

If I might give an example, in Columbus, Ohio, at Battelle, there is a world-famous center of information on one metal alone, titanium. If someone came to us and said, tell us about titanium, we should get in touch with that organization.

Senator MARTIN. I'm glad to know where that is. I met that question head on one time in discussing strategic materials, and I didn't know what button to push. I need to know whom to ask for information and where I can find out about any specific strategic or critical material without my having to hunt them up. That is the clearinghouse function, and they wouldn't take over the whole information agency bearing on titanium or any particular item? They would just tell me where I could go and get it?

Mr. GREEN. That is absolutely correct, sir.

Senator MARTIN. Now, the depository function. Can that be centralized in one agency, or should that just be left distributed as it is?

Mr. GREEN. I think the Library of Congress is fast becoming one of the largest depositories of technical information.

Senator MARTIN. I understand that they are the most comprehensive depository of such information by far. Could they be expanded, or——

Mr. GREEN. There are a half dozen or more science libraries around the country which specialize in science collections. There is one in Kansas City, one in Georgia, one in Chicago, one in Pittsburgh.

They are places where people can come and look at the material and browse through the collections, which is also important.

Senator MARTIN. The whole viewpoint here is that of expanding what we now have by adding a coordinating agency that will function without disturbing present functions of the component parts, and a clearinghouse that will not disturb the present smaller clearinghouses and not change the picture of the depository system as now functioning?

Mr. GREEN. I think that is very well said, sir.

Senator MARTIN. The major benefit from our approach here is to develop some clearinghouse, some coordinating agency, that will not disturb what we are now doing, but allow it to expand and let us know what is going on when we need to know.

Mr. GREEN. Yes, sir.

Senator HUMPHREY. Thank you very much. I shall only add that, as far as I am concerned, the major benefit of these hearings is to get you, who are vested with the responsibility, to think more specifically about the urgent necessity of the coordinated program on a more formal and regularized basis, as has been discussed here today and yesterday; secondly, to set up our activities in the field of research, in the field of dissemination, collating, translating, and retrieving, and so forth, even through the proposals set forth in the pending bill, the bill that is before us, may need to be revised when we have all the facts relative to the needs for developing a complete program. It was well understood when the bill was introduced that it would be controversial, maybe going in directions that people would not want to go, but the Congress had to have something it could get its teeth into, so we could start holding hearings and draw people to us and build a record here. I believe as we go along we are beginning to get—all of us, not just the members of the committee—some cohesive program developed. I know I have a better idea of what is going on and should be going on, and I believe the executive agencies are beginning to see more clearly the outline of what we have and what is needed.

One of the things that has disturbed me about the public-information affect is that the American people got such a shock all at once with that sputnik business that they didn't even assess what they themselves have. What we have here is a tremendous resource. My idea is to marshal those resources and get them marching down the road in unison.

Senator MARTIN. Further along that line, this bill was not presented to us as a finished product. It was something to get us a bill on which to work and carry out these proceedings. Our staff had carried on a considerable study before it came to us, and we needed to have something on which to work, and it was not presented to us as a finished product nor recommended that it be adopted as is.

It was given to us in order to do this study and hereafter to perfect something along the lines that you have brought to our attention.

Mr. WILLIAMS. Backing up your statement of a moment ago, that discussions such as this tend to bring out what we do have, Mr. Overton, Deputy General Counsel of the Department of Commerce, scribbled down a few notes that I think summarize very well what we do have now.

First, we have developers of information and a coordinating function to prevent duplication—National Science Foundation.

Secondly, we have depositories where the information is housed—the Library of Congress.

Third, we have a centralized clearinghouse which directs the citizen to the information he needs—the Office of Technical Services.

I think that rather crystallizes the whole discussion, doesn't it?

Senator HUMPHREY. It does, indeed. I think that is as concise and succinct as you can get.

May I ask Dr. Adkinson one question again?

Dr. ADKINSON. Yes, sir.

(Testimony of Mr. Williams momentarily interrupted for a question, directed by the chairman, to Dr. Burton W. Adkinson, National Science Foundation.)

Senator HUMPHREY. In our report, on page 3 of the staff study of S. 3126 there is a line that reads as follows: "The Interdepartmental Committee for Scientific Research and Development"—then it goes on and tells what it can do.

What would happen to that Committee under the program we are talking about, or is this unrelated to it?

Dr. ADKINSON. No; it is directly related. The Interdepartmental Committee on Research and Development meets regularly, for the purpose of keeping the different departments informed on what all of them are doing and to discuss problems of coordination—as well as other problems that need attention. The chairmanship is rotated among the departments that are represented.

The directors of research and the administrative officers in charge of research are represented on this Committee.

I mentioned this Committee when I previously spoke about the Advisory Committee and the different panels. There is at the present time a subcommittee of the Interdepartmental Committee on Foreign Science, of which I am chairman, which has discussed the problem.

In fact, the idea of OTS assuming responsibility for disseminating the abstracts, translations, and other material on foreign science was endorsed by this group.

In other words, the Interdepartmental Committee will provide a forum which will improve the coordination and will also help by furnishing information which will enable all people to be informed about each others work. That is its big job, plus responsibility to recommend improvement, corrections, actions to correct faults, and the limitation of other activities.

So, we work very closely with it in its coordinating functions.

Senator HUMPHREY. Does the Library of Congress have any representation on that?

Dr. ADKINSON. Not on that committee, no.

Senator HUMPHREY. The Library will have representation on your advisory group?

Dr. ADKINSON. It will, and we invite the Library of Congress in on all problems, because, as I said before, their collections are the keystone to the information activities in the Government. They must understand what we want, and we must understand what they want to do. They will participate.

Senator HUMPHREY. Do you have any comment, Mr. Secretary, on S. 4039, the bill recommended by the National Science Foundation?

STATEMENT OF MR. WILLIAMS—Resumed

Mr. WILLIAMS. We approve it.

Our position is that of support.

Senator HUMPHREY. I gathered that the support might be there. The Bureau of the Budget, I believe, has registered no objection to that bill.

Mr. WILLIAMS. We have already expressed our approval in writing, and the letter will be coming forth in due course to the Bureau of the Budget.

Senator HUMPHREY. Mr. Andrews, do you have anything further that you would like to offer?

Mr. ANDREWS. Well, I would like to bring out the fact that the Patent Office is cooperating with industry. It is carrying a bridge across to the industrial field in that the American Drug Manufacturers Association is collaborating with the Patent Office to extend its steroid research file into the nonpatent literature.

They have appropriated a sum of money with which they are employing a contractor who is going to search through current literature on steroids, and the Patent Office is acting as a distributing agency to punch cards according to the information extracted from the documents and files emanating along with the patent information.

Senator HUMPHREY. So the Patent Office is not only relying upon the congressional appropriations, and not only relying upon the information which is in the hands of the Patent Office itself, but you are working with private industry?

Mr. ANDREWS. That is correct, sir.

Senator HUMPHREY. Extending your efforts and acting in a sense as a correlating and coordinating group for outside efforts; is that correct?

Mr. ANDREWS. Yes, Mr. Chairman.

Mr. WATSON. Mr. Chairman, may I offer to present to the clerk of the committee a series of bulletins which have been prepared by Mr. Andrews' group and which are disseminated widely, giving accounts of the progress which is being made by the Patent Office. Those go to all interested bodies.

Senator HUMPHREY. We will note these by title and make them a part of the record by reference.[1]

Also, I want to note Senator Martin's suggestion that we make part of the record by reference a report of the Advisory Committee on Application of Machines to Patent Office Operations.[2]

I want to conclude your part of the hearing today by an expression of appreciation of the loyal service given to our Government by these agencies.

I think it is a shame that more people don't know really what is going on, and what is being done, when you think of the tremendous amount of work that is going into it.

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[1] The bulletins entitled "Storage and Retrieval of Contents of Technical Literature"; "Advances in Mechanization of Patent Searching"; "Problems in Mechanizing the Search in Examining Patent Applications"; "Storage and Retrieval of Contents of Technical Literature"; "Organization of Chemical Disclosures for Mechanized Retrieval"; "Interrelated Logic Accumulating Scanner (ILAS)"; "A Punched Card System for Searching Sterior Compounds"; "Recent Advances in Patent Office Searching: Steroid Compounds and ILAS"; "Linguistic Problems in Mechanization of Patent Searching"; and "A First Approach to Patent Searching Procedures on Standards Electronic Automatic Computer—SEAC," were retained in the files of the subcommittee.

[2] The report entitled "Report to the Secretary of Commerce by the Advisory Committee on Application of Machines to Patent Office Operations," was retained in the files of the subcommittee

If there is one thing this committee can do this year, I think, it would be to point up the broader dissemination of the tremendous activities that are underway already, and let the public know of the loyal and dedicated people who are conducting those activities.

I have been tremendously impressed, and may I say favorably impressed with the content of the testimony, the desire to improve, the work that is underway in terms of research and development. I think this is all very gratifying.

We know there is room for improvement. That is why we are here.

Undoubtedly we shall get back together again.

Mr. WILLIAMS. Mr. Chairman, as we adjourn, may I, on behalf of my associates and myself, express our thanks to you and to Senator Martin and the other members of the committee?

I should also like to offer congratulations, first, to the awareness that is quite obvious on the part of your committee as to very important matters of our Government, as revealed by the discussion here.

Also, I should like to congratulate you on the very constructively inquiring way in which this hearing has been held. It frankly reassures some of us in the democratic process of exchanging views, as we have today, with the idea of trying to arrive at the right answers. I should like to spread that on the record.

Senator HUMPHREY. Thank you very much. That is very kind of you.

Now, we have representatives from the Central Intelligence Agency here this morning. We have Mr. Paul A. Borel, Assistant Director for Central Reference; Col. Benjamin B. Cain, Acting Chief, Foreign Documents Division; and Mr. John S. Warner, legislative counsel.

STATEMENT OF PAUL A. BOREL, ASSISTANT DIRECTOR FOR CENTRAL REFERENCE, CENTRAL INTELLIGENCE AGENCY; ACCOMPANIED BY COL. BENJAMIN B. CAIN, ACTING CHIEF, FOREIGN DOCUMENTS DIVISION, AND JOHN S. WARNER, LEGISLATIVE COUNSEL

Mr. WARNER. Mr. Chairman, Mr. Borel has a short statement to introduce the subject, and then we'll hold ourselves open for questions.

Senator HUMPHREY. All right, sir.

Do you have extra copies of your statement, Mr. Borel?

Mr. WARNER. It is not in final form, sir.

Senator HUMPHREY. Very well, Mr. Borel, you just proceed. If my colleague and I desire to interrupt you, I hope you will permit us that privilege.

Mr. BOREL. Please do.

Mr. Chairman and members of the committee, as Mr. Allen Dulles has stated in his response to the chairman's invitation, in his letter dated June 18, 1958, we subscribe wholeheartedly to efforts being made to strengthen the scientific information program of the Government.

(The letter referred to follows:)

CENTRAL INTELLIGENCE AGENCY,
Washington, D. C., June 18, 1958.

Hon. HUBERT H. HUMPHREY,
Chairman, Subcommittee on Reorganization,
Committee on Government Operations,
United States Senate, Washington, D. C.

DEAR SENATOR HUMPHREY: Thank you for your letter of June 10, 1958, inviting this Agency to present to the Subcommittee on Reorganization its views on the dissemination of information provisions of S. 3126 and on the various proposals submitted to the subcommittee in hearings last month. We have followed closely the testimony in those hearings and appreciate the materials which have been provided us by your subcommittee staff.

This Agency has long recognized the merit of establishing within the Government a clearinghouse for collecting, translating, abstracting, analyzing, and disseminating unclassified documents of a scientific or technical nature. We have indicated to the Congress and to appropriate Government departments our desire to cooperate in a clearinghouse program. We are currently providing those departments with selected Russian documents translated by this Agency as part of our mission to collect and disseminate information having actual or potential intelligence value.

We would support any program which has as its objective the strengthening of existing arrangements for the dissemination of unclassified foreign documents and would cooperate with the responsible agencies. I appreciate your invitation to discuss these matters, and if you believe it desirable I would be pleased to have Agency representatives appear at the hearings to discuss with the subcommittee the scope of the Agency's participation in the overall program as one of the many sources of translated materials.

Mr. John S. Warner, our legislative counsel, will be pleased to discuss any further arrangements which Mr. Reynolds may wish to make.

Sincerely,

ALLEN W. DULLES, *Director.*

Your committee is performing a singular service in bringing together the extensive data required for study and which can serve as a basis for constructive action in this important field.

Inasmuch as the bill before you proposes actions which would affect our Agency only indirectly, my comments will be both general and brief.

The Central Intelligence Agency is authorized and directed to perform certain services for the Government generally, and some specifically for the benefit of the other intelligence agencies. One of these services is to exploit foreign language publications and to disseminate to the Government the resulting products—in this case mainly translations and related reference aids. The translation of scientific and technical material constitutes an important part of this program. We are not authorized to do this for the public and do not have facilities for so doing.

Senator HUMPHREY. May I interrupt you to say that one of the reasons I was so distressed this morning when I arrived here was that I had an amendment to the Mutual Security Act which was adopted by the Senate—an amendment which was proposed in the committee and was subsequently adopted by the Senate and which we thought had been adopted by the conference of the House and the Senate which would have provided that the foreign currencies which

are presently in the possession of the Government of the United States on deposit in many countries throughout the world, could be utilized, as prorated by the Bureau of the Budget, at least to a limited degree, for the purpose of acquiring foreign documents; scientific and technical documents, the translation of those documents by competent translators in the filed, and making them available to the Government of the United States and the people of the United States by the use of what we call counterpart and other foreign currency funds. Yesterday I had a very unhappy day squabbling over this because, regrettably, some of our colleagues in the House objected to this being in the bill. I feel that it is necessary. I see no reason to have these currencies lying around, losing their purchasing power due to inflation and instability, and at the same time having people complain because we have too much foreign currency and don't know what to do with it when we could utilize this currency for the acquisition of valuable information that may greatly strengthen the industrial power of our country and our national security.

Mr. BOREL. The services of the Central Intelligence Agency in the field of foreign language document exploitation are provided as a service of common concern to the intelligence community. Our translation work is geared directly to requirements provided by one or more agencies in this community. The unclassified translation output in the field of science and technology is now being produced at a rate of 30,000 English-language pages per year. In addition to the utilization of this material by the intelligence agencies, CIA early recognized that a bonus effect could be achieved by providing this material through an appropriate outlet to the American public. Accordingly, early in 1954, we worked out arrangements to make translations available to the Library of Congress. This arrangement continued until January 1957 when the National Science Foundation asked us thereafter to forward our translations to NSF for on-forwarding to the John Crerar Library Translation Center.

The bonus effect, to which I referred above, turns out to be twofold in nature: First, it results in increased assistance to intelligence from the scientific community of the United States in interpreting the significance of foreign scientific development; and secondly, it provides to the scientists of the United States who are not linguists access to the foreign literature in a form usable by them.

Currently, translations and foreign-language aids are also made available to various Government agencies who have responsibility for programs conducted on behalf of the public; for example, the Office of Technical Services of the Department of Commerce receives all of our unclassified scientific and technical reports.

I have here one such example that may be of interest to members of the committee.

Senator HUMPHREY. We'll note it by title and keep it available for reference.[3]

Mr. BOREL. In discharging other responsibilities, we have coped with problems inherent in processing information as well as those related to coordinating the activities of the intelligence community in the field of documentation. We are therefore well aware of the

[3] The document entitled "Scientific Information Report No. 8, June 13, 1958," was retained in the files of the subcommittee.

difficulty and complexity of giving adequate information service to a user.

In view of the divergence of opinions presented to your committee earlier, I am prompted to conclude with two general observations. These are based on our experience as an agency having coordinating responsibility in the field of intelligence information. They should be considered within the context of testimony already in the record.

First, we feel that an information system is an integral part of the organization it is designed to support. In our experience, an information service is a support function and organizationally must be so located to its user activity as to be immediately responsive to that user's need. Otherwise, the information service will, over a period of time, tend to employ its assets as it thinks best. And this may be considerably at variance with what is in fact needed.

Secondly, there are limits to the development of compatibility between information systems serving different users. This generalization is a corollary of the preceding one. In our endeavors to facilitate the exchange of information among our colleagues in the intelligence community, we have as an objective, in the interest of efficiency, the development of compatible systems for processing information. This is an objective worthy of pursuit, but steps to standardize practices and systems should be taken cautiously, especially when commitment to a given system involves the expenditure of large sums for machines and the training of personnel. This point is particularly important now, because many see their salvation in the immediate mechanization of information-processing operations presently performed manually. Hence a caveat: We know of no single machine system which today is demonstrably so superior as to justify its adoption to achieve wholesale standardization.

Senator HUMPHREY. You may recall, at that point, Mr. Borel, that this is what we were discussing with Mr. Watson, Mr. Andrews, and Dr. Adkinson a moment ago. Machines have to be applied and developed to a specific area, to a specific type of topic or information, and there isn't as yet a general machine that has been designed. I think this is what you are saying; that, first of all, in the general application we may lose certain very valuable assets, and, secondly, that we may actually be running up a tree with no results, at great expense. In fact, lessened results, actually, to the detriment of an effective service. Is that what your point is?

Mr. BOREL. It is, sir. I wouldn't want to imply that active research and development and experimentation should not go on in this field. In fact, the burden of the statement really is to the contrary. The state of the art in this field is not sufficiently advanced that we ought at this time to discourage, in some cases, what is called duplication. Only by having several approaches and specialized applications to problems will there eventually be developed some general theory in this field. Perhaps, then, will we have applications which can be applied more generally.

Mr. Chairman and members of the committee, that is the substance of our statement. Mr. Benjamin Cain, the Acting Chief of our Foreign Document Division, is here with me, and we'll be pleased to answer such questions as we can.

Senator HUMPHREY. First of all, we want to thank you for your statement.

Mr. Cain, how are we coming, in terms of the Foreign Document Division? I heard at one time that there were a number of foreign documents lying around, uncataloged, not translated, and so on. Is that true?

Mr. CAIN. No, sir; that isn't true, Senator.

Senator HUMPHREY. I'm sure you have heard the same allegations.

Mr. CAIN. I have, sir. Actually, we have been able to process for our own purposes all of the documents received and we have produced on an average, since 1949, approximately 20,000 pages a year in English. Of course, those are to meet our own requirements. As far as the availability of the documents after we use them, of course, we don't know, because we maintain no library facilities. Those are sent to the Library of Congress or to Mr. Borel's organization. But there has been no backlog in our own needs.

Senator HUMPHREY. Does the Office of Technical Services also act as a clearinghouse for information concerning the information that you develop out of your Foreign Document Division?

Mr. CAIN. Yes, sir; we hope it can be complete, eventually. We are giving to the Office of Technical Services all of our scientific and technical reports. We have maintained since 1949 a rather extensive cumulative index of all of the translations performed by anyone which we know, and those are coming in monthly. Additional cards are being made and sent to the Office of Technical Services so that they can have that information.

Senator HUMPHREY. And to the Library of Congress?

Mr. CAIN. Yes, sir.

Senator HUMPHREY. So, your depository is the Library of Congress?

Mr. CAIN. Yes, sir.

Senator HUMPHREY. Your clearinghouse—you have one of your own, so to speak, in terms of your own needs.

Mr. BOREL. We serve as a clearinghouse for intelligence community needs.

Senator HUMPHREY. When it comes to technical and scientific documents, you also make that information available to the OTS in the Department of Commerce; am I correct?

Mr. CAIN. Yes, sir.

Senator HUMPHREY. Senator Martin, do you have any questions?

Senator MARTIN. I'm very interested in your statement that you have adequate translation facilities to keep up with the translation of all documents which you have obtained. I had understood from previous witnesses that we were somewhat in arrears in that field.

Mr. CAIN. Senator Martin, I didn't mean to say all. I mean all of our priority needs. We would like to produce a great deal more, of course.

Senator MARTIN. You have a staff qualified by training and experience in the technical fields to translate the documents that are taken over by you that are important?

Mr. CAIN. Yes, sir. We are keenly aware, of course, of the importance—nobody can afford duplication, and we have, therefore, coordinated this program with the other members of the community very closely, so that there can be as little duplication as possible. Qualified linguists with scientific and technical backgrounds are hard to come by For that reason, cooperation is easily achieved. So, with our own production and what is done by the other members of the community, we can meet priority needs.

Senator MARTIN. You are the principal field operating agency in the matter of acquiring these foreign documents, are you not?

Mr. CAIN. We are the central—the common—service to the community. Of course, they are procured by a number of departments, as well, but we are well aware of what their take is, so to speak, in conjunction with our own.

Senator MARTIN. Is there an overlap of other agencies functioning in the field in which you are functioning?

Mr. CAIN. Yes, sir; there are a number of exploitation facilities.

Senator MARTIN. Could this complaint that we heard about not having adequate translation facilities apply to the other fields more so than yours?

Mr. CAIN. I don't believe I understand exactly how you mean that, sir.

Senator MARTIN. Well, there are other agencies or interests collecting foreign documents in the scientific field.

Mr. CAIN. Yes, sir.

Senator MARTIN. I had understood from some of the witnesses previous to today's hearing that there was a lag in the matter of translation. I wonder if they are in different fields. You seem to be in good shape.

Mr. CAIN. Well, there is never enough money to accomplish all that we would like to do, but we are meeting priority requirements.

Senator HUMPHREY. You don't translate, do you, all the material, for example, in physics or in chemistry that is in foreign languages?

Mr. CAIN. No, sir; we produce about 2 percent.

Senator HUMPHREY. I think this is where we got into the jackpot on this; that some of the other agency people that came in—and private, not only agency or Government—were saying that it isn't only that they don't have people that understand the language, but, as you said, in understanding substance and in competent endeavor plus the language you run a little short of talent.

Mr. CAIN. Yes, sir.

Senator MARTIN. I was almost convinced that this was a great new field for budding scientists who are good linguists.

Mr. CAIN. Yes, sir.

Senator HUMPHREY. Mr. Warner, do you have anything you would like to add?

Mr. WARNER. I have nothing to add, sir, if you have no questions.

Senator HUMPHREY. Then we are going to move along. Thank you very much for your cooperation and your interest here today.

Colonel Cain has made available to the subcommittee the list that represents the known current Soviet scientific and technical publications.[4] He also informs us that there are approximately 5,000 books per year that are available or obtainable. It will be interesting reading for anyone so interested.

Senator MARTIN. The information is not classified, and we'll be the clearinghouse in this instance.

Senator HUMPHREY. The next witnesses are from the Department of Agriculture. We have Mr. Foster E. Mohrhardt, Director of Library, and Dr. Stanley Fracker, Assistant to the Administrator, Agricultural Research Service.

[4] The publication entitled "Soviet Scientific and Technical Period Publications" was retained in the files of the subcommittee.

We welcome you gentlemen and thank you for taking the time to come and talk with us.

STATEMENT OF FOSTER E. MOHRHARDT, DIRECTOR OF LIBRARY, DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY DR. STANLEY FRACKER, ASSISTANT TO THE ADMINISTRATOR, AGRICULTURAL RESEARCH SERVICE

Senator HUMPHREY. We have your full statement here, Mr. Mohrhardt. You can take your choice. You can read your statement or enter it in the record as if read and hit some highlights in there on which you might want to comment.

Mr. MOHRHARDT. Mr. Chairman, would it be your preference, in view of the time limitations, that I make a summary?

Senator HUMPHREY. I would prefer it myself, if it is agreeable with Senator Martin. I don't want to deny you the opportunity to say what you want to say.

Mr. MOHRHARDT. I think it is said here in the statement, but I'll be happy to go over it lightly.

Mr. Chairman, and members of the committee, I am very happy to represent the United States Department of Agriculture at these important hearings on the section of S. 3126 which concerns Federal programs for "assembling, translating, abstracting, storing, indexing, retrieving, and disseminating scientific information."

Awareness of the importance of scientific communication, was shown in the act of 1862 which established the Department of Agriculture, which compelled us to collect all possible types of agricultural information. As a result of this, we have collected in our library one of the great collections in the field of agriculture and the natural sciences. These include botany, forestry, zoology, entomology, and chemistry.

May I mention the fact that our collections in chemistry are extremely strong and represent one of the best there is in general and agricultural chemistry because of the importance of this field to all agricultural research.

Senator HUMPHREY. Now, right at this point, I want to ask two things. Do you coordinate this activity with the services of the Library of Congress?

Mr. MOHRHARDT. Very definitely; yes.

Senator HUMPHREY. Do you coordinate this with the Office of Technical Services in the Department of Commerce?

Mr. MOHRHARDT. Coordinate—rather, cooperate. In other words, we collect extensively in these fields everything we can acquire that pertains to agriculture. We work cooperatively with the Office of Technical Services; yes, sir.

Senator HUMPHREY. Does the Office of Technical Services know of your collections, and have up-to-date information as to any new developments in your collections?

Mr. MOHRHARDT. Very definitely, sir. At one time, we were one of the agencies for releasing information for the Office of Technical

Services, a comparable service to what the Library of Congress does now.

Senator HUMPHREY. So there is general coordination between the services that you perform, the Library of Congress and the Office of Technical Services?

Mr. MOHRHARDT. Yes, sir. And in addition to that, there is a definite attempt to eliminate any possibility of unnecessary duplication in our operations.

Senator HUMPHREY. I am familiar with your splendid library service. It truly is a wonderful and remarkable library. I had an uncle who used to be in the Department of Agriculture, Dr. Harry B. Humphrey, the Chief Plant Pathologist, and he acquainted me with your library.

Mr. MOHRHARDT. Thank you.

In my statement I indicate that we have streamlined our techniques for acquiring and organizing the information and making it rapidly available. In the English language publications, we do quite a good job. In foreign languages, not quite as good.

We do publish regularly a Bibliography of Agriculture which I shall leave with you. This indexes all of the publications which we receive each month in our library. It indexes all the articles, no matter what the language may be, if we have competent language specialists that can cover them.

Senator HUMPHREY. At this point, Senator Martin wants to come in.

Senator MARTIN. Is that the complete list you are offering now?

Mr. MOHRHARDT. This is the list for June of this year. This appears each month.

Senator HUMPHREY. Mr. Mohrhardt this document will be received for the record and noted by reference and title.[5]

Mr. MOHRHARDT. Two references were made to this bibliography at the first phase of these hearings. Dr. Shera inserted an article for himself and Dr. Egan with a statement that:

> Some of the best comprehensive subject bibliographies in this country have been produced by special subject libraries of the Federal Government,

and then he referred to this library and the Surgeon General's library.

Dr. TAUBE stated—

> The Government issues the Bibliography of Agriculture, the major bibliographical tool in this field.

This is used extensively by scientists and research installations, both in this country and abroad. We now distribute the bibliography to 78 countries throughout the world who are interested in this work. In addition, we have special bibliographies, and I shall leave as an exhibit a list of those special bibliographies that are available to scientists and the other research workers.

Senator HUMPHREY. We will make that a part of the record, at this point.

[5] The document entitled "Bibliography of Agriculture, June 1958, vol. 22, No. 6," presented by Mr. Foster E. Mohrhardt, Director of library, Department of Agriculture, was retained in the files of the subcommittee.

(The list referred to follows:)

UNITED STATES DEPARTMENT OF AGRICULTURE LIBRARY

Library List No. 25, Revised

Washington, D. C., December 1957

AVAILABLE BIBLIOGRAPHIES AND LISTS

Bibliography of Agriculture, v. 17, 1953–date.

Bibliographical bulletins:

12. List of serials currently received in the Library of the United States Department of Agriculture, November 1, 1949. 349 p.
Supplement 1, July 1953. 218 p.
14. Bibliography of plant pathology in the Tropics and in Latin America. February 1951. 78 p.
15. Bibliography on the marketing of livestock, meat, and meat products. June 1951. 209 p.
16. Bibliographic style, a manual for use in the Division of Bibliography of the Library. June 1951. 30 p.
18. The forests of continental Latin America (including European possessions); a bibliography of selected literature, 1920–1950. May 1952. 193 p.
19. Tropical beef cattle industry in the Western Hemisphere. May 1952. 157 p.
22. Land ownership; a bibliography of selected references. January 1953. 293 p.
24. Rural electrification in the United States. April 1954. 148 p.
25. Voluntary health insurance. December 1954. 62 p.

Miscellaneous publication:

713. Drainage of agricultural land. May 1956. 200 p.

Library lists:

1, rev. Selected list of American agricultural books. June 1956. 26 p.
18, rev. Partial list of United States farm papers received in the U. S. Department of Agriculture Library. August 1956. 3 p.
25, rev. Available bibliographies and lists. December 1957. 1 p.
30, rev. Classification scheme of the Bibliography of Agriculture. January 1950. 27 p.
31, rev. Rice hulls and rice straw, 1907–1955; a list of references. July 1957. 24 p.
40. The Mississippi Delta: its economy and land use. January 1948. 154 p.
41, Supplement 1. Bibliography on cooperation in agriculture. June 1954. 21 p.
42. Packaging and prepackaging of fresh fruits and vegetables, July 1946–December 1947. April 1948. 30 p.
44. Cellulose-water relations; a selected bibliography with special reference to swelling of cotton and to its utilization in water-resistant fabrics. March 1949. 63 p.
47. Crop and livestock insurance, 1941–1948. June 1949. 14 p.
48. Bibliography on extension research, November 1943 through December 1948. July 1949. 19 p.
49. Physical risks in farm production. August 1949. 29 p.
51. A preliminary bibliography on rural housing and farm service buildings. December 1949. 159 p.
52. Economics of forestry; a bibliography for the United States and Canada, 1940–1947. June 1950. 116 p.
Supplement 1. June 1955. 136 p.
53. Cacao; a bibliography on the plant and its culture and primary processing of the bean. October 1950. 49 p.
54. Farm, home, and community uses of electricity. February 1951. 30 p.
55. World land reform; a selective bibliography. September 1951. 19 p.
56. Thatched roofs. February 1953. 1 p.
57. School lunches, 1946–1952. March 1953. 35 p.
58. Forest research programs; a selected bibliography of United States literature. April 1953. 4 p.
59. Migratory agricultural labor in the United States. May 1953. 64 p.
60. Rural health. June 1953. 83 p.
61. Agricultural labor in the United States, 1943–1952. March 1954. 170 p.
62. Low-income farm people. May 1955. 46 p.
63. Small watersheds; a selected list of references. October 1957. 16 p.

Mr. MOHRHARDT. Then, to give further guidance to the people who need research materials, we do have available a list of serials currently received in our library. This is the latest supplement. We have a file of 22,000 current serials that we receive in the sciences. These are available to anyone, and we issue this list so that they can check and know what is available and in our library in terms of current journals and serial publications. I'll also leave this for the record.

Senator HUMPHREY. By reference, it will be made a part of the record.[6] I will ask Mr. Reynolds to follow up on these items.

Mr. MOHRHARDT. In addition, we have a note each month in the Bibliography of Agriculture that indicates if anyone is interested in obtaining a copy of any article in this publication, he may obtain it from us by photocopy. That is, by photostatic copy or microfilm. In addition, we provide material on interlibrary loan.

Senator HUMPHREY. I see you have a working arrangement with Chemical Abstracts as well.

Mr. MOHRHARDT. Yes, sir, we had a formal arrangement for 10 years in which we furnished any subscriber with any article in Chemical Abstracts. Through arrangements mutually advantageous, this was discontinued a couple of years ago. We do supply an amazing amount of material to pharmaceutical firms and chemical firms from our collection.

May I call attention to this section on mechanical devices and automation. In the hearings on May 7, 1958, Senator Lausche asked:

> Do you know of any contracts that have been let by any governmental agency or quasi-governmental agency for the purpose of making research in the development of mechanical devices that will aid in the solving of this question?

The answers on that day referred only to recent contracts. The pioneer effort in mechanization and the one which focused attention on this field was not mentioned. This was the development (by Dr. Ralph R. Shaw, then Director of the USDA Library) of the experimental model of Dr. Vannevar Bush's Rapid Selector. In view of the emphasis which was given in part 1 of these hearings to Russian activities in the documentation field, it is regretted that American efforts were neglected. In 1947, in cooperation with the Office of Technical Services of the Department of Commerce and with a small grant from that Office, Dr. Shaw developed a pilot model of the Rapid Selector.

I would like to insert also, what Mr. Fry of the Atomic Energy Commission pointed out yesterday:

> Support was also given to research and development work on the Rapid Selector carried on by the Department of Agriculture.

We had support from OTS and from the Atomic Energy Commission.

The machine was able to store printed information on coded microfilm in such a way that it could be rapidly scanned, selected, and photographed for the user. The limited funds available did not make possible a wide-scale experiment with this machine. The development and evaluation of machine techniques which Dr. Shaw made in this experiment have been extremely important in showing the limitations of nonbook storage devices as well as indicating potentialities, and they have greatly influenced research in this field.

[6] The document entitled "List of Serials Currently Received in the Library of the United States Department of Agriculture, Supplement 1, as of March 1953," was retained in the files of the subcommittee.

I think this ties in with Mr. Borel's statement.

Senator HUMPHREY. Does it also tie in with the program as discussed here this morning by the National Science Foundation representative, wherein the National Bureau of Standards would be involved in some experimentation and development work in machines?

Mr. MOHRHARDT. Yes, sir. It is my understanding that the machine now is in the National Bureau of Standards. Our coordination has been very close with all of the experts in that department.

Senator HUMPHREY. Very good. Thank you, sir.

Mr. MOHRHARDT. Briefly to refer to the science library services, may I call your attention to the Library of Congress statement:

> The existence of National Library of Medicine and a National Library of Agriculture (the library of the Department of Agriculture) does not argue for further fragmentation of the national collection. To the contrary, these two libraries were years in building, and the recognition of them as the national libraries in their fields was only acceptance of historic fact.

We agree with Senator Humphrey's statement:

> Existing laws are adequate to permit agencies of the Government operating in this area to provide the necessary facilities to initiate coordinated Federal programs without the necessity of enacting further enabling legislation.

Senator HUMPHREY. I think I should have modified that. I was rather assertive there. Perhaps I should have said "Existing laws appear to be adequate." I ask unanimous consent to so modify my statement.

Senator MARTIN. No objection.

Mr. MOHRHARDT. In summary, I should like to point out that the holdings of the USDA library in publications prior to 1940 are good but that the completeness of our collections has declined with the extensive growth of new scientific journals, increased publication of worldwide research reports, and rising costs of library service. The basic collection of printed publications and a core staff are available so that the USDA library can readily be developed to provide coverage of scientific information and services that are determined to be in the national interest.

We in the Department of Agriculture are alert to the need for adequate and more effective facilities for the collection and dissemination of scientific information, particularly translations of foreign materials in fields relating to agriculture. Accordingly, we are currently reviewing our own library services. We are also supporting proposals for additional legislative authorities for the use of foreign currencies, when available, to obtain translation of publications not now available to us in English.

Senator HUMPHREY. I'm going to see that you get another star in your crown for that last paragraph.

Mr. MOHRHARDT. I'm not sure I have any, but thank you for the one.

Senator HUMPHREY. You have some already, but you need one diamond-studded one for that.

Mr. MOHRHARDT. Do I collect it as I go out the door?

Senator HUMPHREY. Yes.

Mr. MOHRHARDT. Thank you.

(The complete statement of Mr. Mohrhardt follows:)

STATEMENT OF FOSTER E. MOHRHARDT, DIRECTOR, UNITED STATES DEPARTMENT OF AGRICULTURE LIBRARY, IN REFERENCE TO THE SECTION ON SCIENTIFIC AND TECHNICAL INFORMATION OF SENATE BILL 3126

Mr. Chairman and members of the committee, I am very happy to represent the United States Department of Agriculture at these important hearings on the section of S. 3126 which concerns Federal programs for assembling, translating, abstracting, storing, indexing, retrieving, and disseminating scientific information.

Awareness of the importance of scientific communication was shown in the act of 1862 which established the Department of Agriculture. It reads:

"*Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled,* That there is hereby established at the seat of government of the United States a Department of Agriculture, the general designs and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of the word * * *."

Section 3 of the act reads:

"*And be it further enacted,* That it shall be the duty of the Commissioner of Agriculture to acquire and preserve in his department all information concerning agriculture which he can obtain by means of books and correspondence, and by practical and scientific experiments (accurate records of which experiments shall be kept in his office,) by the collection of statistics, and by any other appropriate means within his power * * *." [7]

The early Commissioners of Agriculture began at once to collect scientific and technological information. The immediate success of their efforts is shown in the 1867 request of the Commissioner of Agriculture for a librarian to handle the publications being acquired by purchase, gift, and exchange. Success is also shown in the 1876 report of the Commissioner of Education which states that "In the subjects of agriculture and natural history, and their kindred branches of botany, geology, entomology, and chemistry, this library [U. S. Department of Agriculture] is undoubtedly the most complete on the continent." [8] The needs of the Department's basic and applied research stimulated the assembling of worldwide scientific information in these subject fields.

The brief outline below will respond directly to your request for an assessment of our collection, organization, and dissemination of scientific information.

A. COLLECTION AND ASSEMBLING OF SCIENTIFIC PUBLICATIONS

The first research unit established by the Department of Agriculture in 1862 was the Division of Chemistry. Since that date chemistry has been the underlying science for much of agricultural research. As a result the Department of Agriculture Library has assembled one of the most complete collections of books, pamphlets, and journals in general and agricultural chemistry. Other scientific areas where our collections are unusually strong are botany, fields of zoology, agricultural bacteriology, entomology, forestry, soils, agricultural engineering, veterinary medicine, and plant pathology. For these fields of specialization our holdings are outstanding, and, in many cases, unique, particularly for publications prior to 1940. It is estimated that three-fourths of our collection has been built up through national and international exchange of publications. The availability of United States Department of Agriculture publications for exchange with other countries makes it possible for us to acquire publications which are not on the book market and which would not be available in any other way.

B. ORGANIZATION AND DISSEMINATION OF PUBLICATIONS

1. Organization

Streamlined techniques enable our library staff to record, catalog, and make available very rapidly most English-language publications received by the library. Foreign language-materials are not handled as expeditiously nor as completely.

2. Dissemination of information

The current resources of the library are rapidly brought to the attention of potential users through the Bibliography of Agriculture which is issued each month. References to this publication were made by various experts at the

[7] An act to establish a Department of Agriculture. Approved May 15, 1862.
[8] U. S. Bureau of Education. Special report, 1876, pt. 1, p. 272.

first phase of these hearings: Shera and Egan state, "Some of the best comprehensive subject bibliographies in this country have been produced by special-subject libraries of the Federal Government, such as the Department of Agriculture Library and the Library of the Surgeon General's Office." [9] Dr. Taube stated that "the Government issues the Bibliography of Agriculture, the major bibliographical tool in this field." [10] This monthly publication indexes by subject significant books, journal articles, and pamphlets in the entire field of agriculture and the related sciences. It is used by individual scientists and major research installations, both in this country and abroad. In addition to this regularly issued bulletin, we also publish special bibliographies in subjects requested by Department research workers, and a lits of the journals, magazines, and other serial publications received by our library. At present, our current file contains over 22,000 publications from every part of the world.

3. The Bibliography of Agriculture carries a note each month indicating that copies of any articles listed in the publication may be obtained in photocopy or microfilm form from the USDA Library. The pioneer effort in extending library services through photocopying of publications began in the USDA Library in 1934 in cooperation with the American Documentation Institute. From 1946 to 1957 the library had a joint arrangement with the American Chemical Society to provide them with photocopies of all articles listed in Chemical Abstracts.

4. Holdings of this library are available to the general public through use in the building. Further availability for research workers is given through nationwide interlibrary loan and photocopy.

C. MECHANICAL DEVICES AND AUTOMATION

In the hearings on May 7, 1958, Senator Lausche asked "Do you know of any contracts that have been let by any governmental agency or quasi-governmental agency for the purpose of making research in the development of mechanical devices that will aid in the solving of this question?" [11] The answers on that day referred only to recent contracts. The pioneer effort in mechanization and the one which focused attention on this field was not mentioned. This was the development (by Dr. Ralph R. Shaw, then Director of the USDA Library) of the experimental model of Dr. Vannevar Bush's rapid selector. In view of the emphasis which was given in phase 1 of these hearings to Russian activities in the documentation field, it is regretted that American efforts were neglected. In 1947, in cooperation with the Office of Technical Services of the Department of Commerce and with a small grant from that office, Dr. Shaw developed a pilot model of the rapid selector. The machine was able to store printed information on coded microfilm in such a way that it could be rapidly scanned, selected, and photographed for the user. The limited funds available did not make possible a wide-scale experiment with this machine. The development and evaluation of machine techniques which Dr. Shaw made in this experiment have been extremely important in showing the limitations of nonbook-storage devices as well as indicating potentialities, and they have greatly influenced research in this field.[12]

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[9] Science and Technology Act of 1958. Hearings, pt. 1, p. 17.

[10] Ibid., p. 185.

[11] Ibid., p. 230.

[12] The Rapid Selector is the culmination of many years of development and experimentation, some directly connected with this particular end product and others in the fields of organization of knowledge, electronics, mechanics, and other fields.

The first practical application of electronics to selection of data on film appears to have been made some 20 years ago by Dr. E. Goldberg, who at the time was with Zeiss in Dresden. His invention, which was protected by United States Patent No. 1,838,389 issued on December 29, 1931, covered a method for electronic searching using "the radiating energy to actuate a recorder when the explored indications upon the search plate and record element are identical, the indications on one of said elements being penetrable by the rays and the indication on the other element being impenetrable by the rays."

The basic principles of organization of knowledge applied in the present machine were developed by Dr. Vannevar Bush at the Massachusetts Institute of Technology more than 10 years ago, and, while many changes were made in operating details in designing the Rapid Selector, its basic electronic system should be credited to Dr. Bush.

The funds for development of the Rapid Selector were provided by the Office of Technical Services of the Department of Commerce from an appropriation intended for development of new tools to advance the technological development of the Nation and to result in wide public benefit. Mr. John C. Green, Director of the Office of Technical Services, not only supervised the contractual details, but also was of constant assistance in technical aspects of the development of the work.

The Engineering Research Associates of St. Paul, Minn., selected and designed the electrical, optical, and mechanical components, and assembled this first machine.

The author, with Dr. Bush's permission to use his concept for the public good, developed the program, devised the method of mounting the coding system so that any size document could be taken without changing the size of the dot codes, devised the triggering dot scheme so that multiple codes could be used in connection with a single reproduction of the text data, and supervised the design, construction, and testing of the machine. The machine is now being remodeled in cooperation with the National Bureau of Standards to simplify and improve it on the basis of operating experience. (Shaw, R. R. Machines and the Bibliographical Problems of the Twentieth Century. University of Illinois Press, 1951.)

D. NATIONAL SCIENCE LIBRARY SERVICES

The Library of Congress stated in part 1 of your hearings that "The existence of a National Library of Medicine and a National Library of Agriculture (the library of the Department of Agriculture) does not argue for further fragmentation of the national collection. To the contrary, these two libraries were years in building, and the recognition of them as the national libraries in their fields was only acceptance of historic fact." [13] On page 11 of the hearings the Librarian of Congress says in referring to his library "I suggest that a fruitful course of action would be to strengthen and enlarge the Library's established program rather than embarking on a new one." [14] We agree with Senator Humphrey's statement "that existing laws are adequate to permit agencies of the Government operating in this area to provide the necessary facilities to initiate coordinated Federal programs without the necessity of enacting further enabling legislation." [15]

Scientific documents are far too voluminous for their collection to be assigned advantageously to a newly created bureau with all the functions listed in section 107 (b) (3) and (4) of the proposed bill. In a number of respects these subsections duplicate services that are being rendered (somewhat inadequately, it is true) by these three libraries, by various abstracting journals, by OTS in Commerce, and by various other agencies in the Departments of Agriculture; Health, Education, and Welfare; and Interior.

In summary, I should like to point out that the holdings of the USDA Library in publications prior to 1940 are good but that the completeness of our collections has declined with the extensive growth of new scientific journals, increased publication of worldwide research reports, and rising costs of library service. The basic collection of printed publications and a core staff are available so that the USDA Library can readily be developed to provide coverage of scientific information and services that are determined to be in the national interest.

We in the Department of Agriculture are alert to the need for adequate and more effective facilities for the collection and dissemination of scientific information, particularly translation of foreign materials in fields relating to agriculture. Accordingly, we are currently reviewing our own library services. We are also supporting proposals for additional legislative authorities for the use of foreign currencies, when available, to obtain translations of publications not now available to us in English.

Senator HUMPHREY. The line where you talked about "particularly translations of foreign materials in fields relating to agriculture." As I understood earlier from one of your comments, you still have need in that area. You still have a backlog of material that you would like to accumulate in the form of translations from foreign sources; is that correct?

Mr. MOHRHARDT. Yes; and if I may extend that, there are foreign materials that we would like to acquire that we have not been able to at the present time, as well as the translations themselves.

Senator HUMPHREY. Are you familiar with S. 4039, one of the bills before this committee?

Mr. MOHRHARDT. May I refer the question to Dr. Fraeker?

Senator HUMPHREY. Surely.

Mr. FRACKER. Senator, I do not have a prepared statement on S. 4039, but I shall be glad to make a little explanation as to where it fits in with the work of the Department of Agriculture.

Senator HUMPHREY. I would appreciate that.

Mr. FRACKER. The explanation of this bill as published in the Congressional Record refers to the Department of Agriculture as already having authority to make grants to educational institutions and others for scientific work. I should explain that the authority in the Department of Agriculture relates only to the administration of statutory grants, and that the Department does not have authority

[13] Ibid., p. 13.
[14] Ibid., p. 11.
[15] Ibid., p. 2.

to make discretionary grants for specific projects and specific amounts, such as is within the authority of, say, the National Institutes of Health. The Department does have authority to make research contracts and makes a number of them each year. Some of the contracts get quite closely into the field of basic research, where it is very difficult to describe precisely what the contractor is to do. It would accordingly be useful for the Department of Agriculture to participate in the authority that this bill carries, S. 4039, with respect to discretionary grants.

We would also agree with the comments made by the National Science Foundation on section 2 of bill S. 4039, which relates to the title to equipment and the advantages of making it possible, in the discretion of the grantor agency, for the grantee to retain equipment that was purchased under the grant.

Senator HUMPHREY. So in the main, you do support the purposes of S. 4039?

Mr. FRACKER. Yes, sir.

Senator HUMPHREY. It would strengthen your basic research activities, as I understand it? Lend itself toward that?

Mr. FRACKER. That is right.

Senator MARTIN. It would supply you with the authority that you do not now have?

Mr. FRACKER. That is right, sir.

Senator MARTIN. On the discretionary basis?

Mr. FRACKER. That is right.

Senator HUMPHREY. Well, I think that since the hour is late and since you have been here a long time, we are going to recess. Before we do, I want to express my thanks to the witnesses of the Department of Agriculture. I'm sure that I speak for the members of this subcommittee and for many Members of Congress when I say that we are all very proud of the library of the Department of Agriculture. I can think of no other Department that performs more personal service and public service in the way of documents. Maybe that is because we are from Minnesota and Iowa, Senator Martin, but I sure get a lot of requests for documents from the Department of Agriculture Library.

Senator MARTIN. I have watched your activities and we are very proud of what you have done in the disseminating of information to the people of America. You have made an outstanding contribution to America's leadership in agriculture.

Mr. MOHRHARDT. I interpret these thanks as being directed to the people who really do the work over there. Thank you very much.

Senator MARTIN. You do as much as anybody to get that work out.

Senator HUMPHREY. The balance of the witnesses will come back at 2:30.

(Whereupon, at 12:30 p. m., the hearing was recessed until 2:30 p. m. the same day.)

AFTERNOON SESSION

Present: Senators Humphrey (presiding), and Martin of Iowa.

Staff members present: Walter L. Reynolds, chief clerk and staff director; Ann M. Grickis, assistant chief clerk; Eli E. Nobleman and W. E. O'Brien, professional staff members.

Senator HUMPHREY. Will the entire group of witnesses representing the Department of Health, Education, and Welfare, Dr. Joseph E. Smadel, Dr. Scott Adams, and Col. Frank B. Rogers please come forward?

I understand our friend, Colonel Rogers must leave. What time do you have to catch an airplane?

Colonel ROGERS. I have to leave here at 3:30 to catch the plane at 4:30.

Senator HUMPHREY. All right; we will get you out of here in 25 minutes.

Colonel ROGERS. Fine.

STATEMENT OF DR. JOSEPH E. SMADEL, ASSOCIATE DIRECTOR; DR. SCOTT ADAMS, LIBRARIAN; AND LT. COL. FRANK B. ROGERS, DIRECTOR, NATIONAL LIBRARY OF MEDICINE, NATIONAL INSTITUTES OF HEALTH

Colonel ROGERS. Mr. Chairman, I am Lt. Col. Frank B. Rogers, Medical Corps, United States Army, detailed to the Public Health Service as Director of the National Library of Medicine.

In the summer of 1956, the Congress passed the National Library of Medicine Act. In a few weeks from now, we will pass our second anniversary.

In 1961, 3 years from now, we intend to celebrate our 125th anniversary.

This paradox is explained by the fact that the National Library of Medicine is the latest embodiment of an institution which came into existence in 1836, as the Library of the Surgeon General's Office, United States Army.

Following the Civil War, for 30 years Dr. John Shaw Billings was Director of the Library, and he developed it into the greatest collection of medical literature in the world, an eminence which I think the library still holds.

Dr. Billings also provided published bibliographical keys of comparable magnitude.

I would like to display to you the title page of the specimen catalog which Billings published in 1876. I think that even at this distance of 15 feet, you will be able to note the 24-point type of letter in which he designates this, in 1876, as the "Catalog of the National Medical Library."

With your permission, I would like to read two sentences from Dr. Billings' prefatory statement to this catalog:

> I cannot doubt that if a sufficient number of the catalog, of which this is a specimen, be printed, and distributed to our medical writers and teachers, so that they may at their leisure learn what aid they can obtain in their researches, no collection of the Government will be more used or be of more practical utility; that it will soon tend to elevate the standard of medical education, literature, and scholarship of the Nation, and will thus indirectly be for the benefit of the whole country, since the general knowledge and skill of the medical profession become a matter of personal interest to almost every individual at some time during the course of his life.
>
> For these reasons and for others which will readily suggest themselves, it has appeared to me to be the duty, as well as the privilege of the National Government to make this collection of the literature of medicine as complete as possible,

and to provide a catalog of it of such a kind as would be of most practical working value.

Billings' plans were approved, Congress appropriated the necessary funds, and in 1880, the first volume of the great Index-Catalogue of the Library of the Surgeon-General's Office" began to appear. Fifty-eight volumes of the Index-Catalogue were published down through 1950.

The 3 million subject references to the literature of medicine contained in these 58 volumes constitute a permanent body of reference covering publications of the 15th to the 20th century.

Speaking of this catalog, the late Dr. William H. Welch, an eminent pathologist at Johns Hopkins University, once said:

> I have been asked on more than one occasion what have been the really great contributions of this country to medical knowledge. I have given the subject some thought and believe that four should be named: (1) the discovery of anesthesia; (2) the discovery of insect transmission of disease; (3) the development of the modern public health laboratory in all that term implies; (4) the Army Medical Library and its Index-Catalogue.
>
> This library and its catalog are the most important of the four.

This opinion was widely shared. Dr. Welch died in 1934. When, in 1950, we took the momentous decision to discontinue the Index-Catalogue, which we felt was essentially a 19th century mechanism no longer responsive to the changing needs of mid-20th century medicine, we did so with some trepidation.

We sought the advice of experts in the field of medicine and bibliography.

We had a committee of 12 men, among whom was one of those testifying at the hearings before this committee last month, who met over a period of 3 years before recommending radical changes in our publication program.

To replace the Index-Catalogue, in 1950, 2 publications sprung up to take the place of the 1 which had existed before.

We began publishing annually with the great help of the Library of Congress, a catalog of the books which had passed through the hands of our catalogers during the year.

This catalog lists books by author and by subject, and is cumulated every 5 years. The first 5-year cumulation was published in 1955, for the years 1950 through 1954, and that cumulation ran to 6 volumes.

We began publishing monthly our Current List of Medical Literature, an index to the articles appearing in the periodical literature of medicine worldwide. In this publication, we list over 100,000 medical articles each year, to which we furnish about half a million subject-and-author entries. The subject and author indexes are cumulated every 6 months. The Current List is sold by the Superintendent of Documents for $13.50 per year, and enjoys a distribution of 4,500 copies, about 2,500 in this country and 2,000 throughout the rest of the world.

Senator HUMPHREY. Is that index made available free of charge to the depository libraries, to a number of medical schools, and public and charitable institutions?

Colonel ROGERS. It is made available free of charge, sir, to medical institutions of the Federal Government, and to duly designated depository libraries.

Otherwise, it is available on subscription at $13.50——

Senator HUMPHREY. In other words, a medical school, the University of Minnesota Medical School, the Harvard Medical School, whatever it is, would have to pay for it.

Colonel ROGERS. Unless they are designated a depository library; yes, sir.

Besides these major publications, the National Library of Medicine pursues other ventures. We have published a series of major bibliographies on topics of great current interest, of which this one on Cancer Chemotherapy is representative.

At present we have two more of these major bibliographies in press, one on psychopharmacological agents——

Senator HUMPHREY. On what?

Colonel ROGERS. On psychopharmacological agents, that group of tranquilizer drugs, and one on space medicines. Volume 3 of our annual Bibliography of Medical Review will appear next month. Now in press for August publication, is a book entitled "Guide to Russian Medical Literature" to which we will give wide distribution.

Senator HUMPHREY. Do you have a guide to German medical literature and a guide to French medical literature?

Colonel ROGERS. No, sir.

Senator HUMPHREY. What makes these Russians so important?

Colonel ROGERS. Just interest at the present time, sir. And, the difficulty of the language.

Senator HUMPHREY. I really think we overdo this business. Do not misunderstand me, I think it important that we keep track of the Soviet Union and they keep track of us, and we should get better acquainted. I am for this.

However, I think we are kind of on a binge here where we need a little settling down. I am still of the opinion that French medicine may be every bit as good as Soviet medicine. And I am of the opinion that Scandinavian medicine is better than both. And I am of the opinion we can learn a lot from the British. I see no reason why we should discriminate.

Do not misunderstand me, I am not being critical at all. In fact, I want to be helpful. I am all for the publications that you are making, but I would suggest that the literature in the field of medicine from other countries might be every bit as enriching and valuable as that from the Soviet.

It is just like I said about the Soviet Ambassador here in the United States. He gets all the publicity, but he is not a bit smarter than many others I have met. As a matter of fact, I do not think he is any more attractive or any more interesting. I find one of the most interesting and one of the most brilliant, one of the most able, ambassadors is from one of the very small countries. He hardly ever gets any publicity. I do not want to mention any particular names, around here except the one that I have.

But I see no reason to build these fellows up into supermen. Now having said that, when are we going to publish something about those Scandinavians? There are lots of them in my State.

Colonel ROGERS. This literature has been available for a long time. Its importance has been recognized for a long time. I believe that the particular interest in the Russian literature simply stems from the fact it has just recently become of interest, and was relatively unknown before this time.

Senator HUMPHREY. And it is true that we have had little or no information before about the Russian medical accomplishments?

Colonel ROGERS. No, sir. I believe this "Guide to Russian Medical Literature" will show that for a long time some of us at any rate have known what was going on in the Russian medical literature.

Senator HUMPHREY. I do not need to take any more of your time on it, but when I think of the great scientists, in such countries as Denmark, I say they have none better in the Soviet. It just seems to me that sometimes we give these fellows front billing when they are really a class B show. And I think they ought to be recognized for what they are.

They have brilliant scientists; I know that. The Soviet has great scientists, and has many excellent doctors who have performed some very great accomplishments in the field of medicine, but it is not unique. I mean, it is not exclusive. I think the truth is some of the highest quality medical care in the world can be found, for example in Sweden, in Norway. I visited their clinics, met with their doctors, talked with their nurses, have been in their hospitals, and when I stop and think they had cut down some of the disease rates so much in the Scandinavian countries, that they had to import people to work on. I think that is pretty good. They actually had to go out and find sick people for certain diseases and bring them in to work on them.

Am I right?

Colonel ROGERS. I judge that you are, sir.

Senator HUMPHREY. Thank you, sir. You see, you are a diplomat. Go right ahead, sir.

Colonel ROGERS. A large bibliographical publication program of this kind cannot rest in midair. It finds its solid base in the collections assembled at the Library over the years.

At present the library contains over a million pieces, books, journals, theses, pamphlets, and microfilm. In our serial record we log in over 13,000 current medical serial-type books from all over the world.

All of this apparatus, the collections and the bibliographical publications, could not be exploited to the full without a mechanism for making the materials available to the researchers who need them. We have this mechanism in our interlibrary loan system. Through the use of xerographic reproduction and otherwise, we answer 75,000 requests each year which come to us from medical institutions throughout the United States.

Mr. Chairman, that is, in briefest outline, the picture of what is going on in one of the Federal Government's major efforts in the field of science information services.

Before closing, I would like to interject a thought which seems to me to have been conspicuous by its absence in previous testimony before this committee.

This is the idea that, after all, there are other abstracting and indexing services in the Western World, but not published in the United States, which are freely available to us, and which we can disregard only to our detriment.

It might be stated, for example, that there is no major, comprehensive abstracting service covering the broad field of medicine which is published in the United States.

This is true. But it omits a truth of equal moment, namely, that one of the very largest abstracting services, in medicine or any other field of science, is Excerpta Medica, which is published in Amsterdam, in the English language, and is widely available in this country.

I have here a copy of World Medical Periodicals, second edition, 1957, which is, significantly, published by the World Medical Association. This publication lists data on some 4,800 current medical periodical titles, including 51 principal international abstracting and indexing journals in the field of medicine.

Of these 51 titles, there are 17 which are published in the United States, but an additional 12 titles are published elsewhere in the English language. In other words, 29 out of 51 principal international medical abstracting and indexing services are available in the English language to our medical people. I would submit that this is a significant datum when we come to assess the adequacy or inadequacy of science information services available to the scientific community in the United States.

Senator HUMPHREY. Now, Dr. Rogers, when you say there are 29 of these abstract journals—is that what you call them?

Colonel ROGERS. Abstracting and indexing services; yes, sir.

Senator HUMPHREY. Available in the English language, does that mean that you have been available, or that you can make them available, through the National Library of Medicine?

Colonel ROGERS. All of these services are available in our library, and, I feel, in most of the other major medical and scientific libraries in this country, for that matter. This principal group, certainly——

Senator HUMPHREY. You have interchange, in other words, with what you call Excerpta Medica in Amsterdam?

Colonel ROGERS. We have this service. We buy it.

Senator HUMPHREY. You buy this service?

Colonel ROGERS. Yes, sir.

Senator HUMPHREY. And you buy the service of others; is that correct?

Colonel ROGERS. We either purchase them on the market or we exchange our publications for them; yes, sir.

Senator HUMPHREY. In other words, anyone who contacts the National Library of Medicine would not only be able to receive the abstracts of the articles, information that is available in United States publications, but would be able to receive that which has been abstracted and indexed in all these other American facilities throughout the world. Is that right?

Colonel ROGERS. Yes; we can make them available to them, to anyone who inquires.

Senator HUMPHREY. That does not mean that you have journals, does it?

Colonel ROGERS. Yes, sir; we try to make an absolutely exhaustive collection of the medical literature of the world, wherever published in whatever language of whatever time, and we do it——

Senator HUMPHREY. So, there may be a considerable amount of duplication in terms of your own abstracts and your own indexes as compared to, let's say, the one from Amsterdam. I mean the one in Amsterdam may have much of what you have, and you may have all of what they have; is that correct?

Colonel ROGERS. That is very true, sir. The medical literature which is being indexed in the Current List of Medical Literature is the same large body of medical literature which is being abstracted in Excerpta Medica. There are little differences here and there. There is a group of titles which we do not index at all; another which they do not index at all. But there are differences between indexes and abstracts. One of the major differences is that, by the very nature of the beast, it is possible to get indexes out much more rapidly than abstracting services.

Senator HUMPHREY. I understand.

Colonel ROGERS. And this is the kind of service which this publication renders. Our objective is to throw our net as widely as possible and to get the information out as quickly as we can.

Now, by the very nature of abstracting, it takes a little more time; it has to be a little more selective than an index publication. It is true that thousands of the same articles can be picked up from this publication, or from Excerpta Medica, but that, in my mind, is not what would come under the heading of unwarranted duplication of services.

Senator HUMPHREY. Oh, no; I was not indicating that. I was just trying to get the picture here. Are there any private indexing and abstracting services in the United States.

Colonel ROGERS. Yes, sir.

Senator HUMPHREY. Do you get those for your library?

Colonel ROGERS. Yes, sir.

Senator HUMPHREY. And do those private services overseas, in other parts of the world—I imagine they are private services of bibliography, indexing, and abstracting—do you get those?

Colonel ROGERS. Yes, sir

Senator HUMPHREY. So, when we talk about the National Library of Medicine in the United States, we are talking about an institute, or institution, that, if it does not have on hand the exact information, it knows where to go and get it; is that correct?

Colonel ROGERS. If we do not know, I do not know who you would go to to find out.

Senator HUMPHREY. I mean, within the possibility of human comprehension, in this day and age, if someone requests information about research, let us say, in a certain aspect of medicine and identifies the line of direction of research, you are prepared, through the National Library of Medicine, to acquaint that individual with, or provide to that individual or for that individual, a vast array of research material that may be related to the subject matter of your client; is that right?

Colonel ROGERS. That is correct, provided only that that information does exist in the published literature.

Senator HUMPHREY. That is what I mean; in the published literature. All right. Now, how does this fit in with the Library of Congress?

Colonel ROGERS. Well, ever since Billings' day, 75 years ago, there has been a working relationship between the Library of Congress and the National Library of Medicine. For example, the Library of Congress, since Billings' day, has always turned over to us copyright deposit books in our field. We have tried to separate what we collect and what our job is from what their job is. Libraries are very expensive, and we do not like to duplicate each other unnecessarily.

Senator HUMPHREY. Now, representatives of the Office of Technical Services, Department of Commerce, this morning said they do not act as a depository. If they get materials, and they have a translation service, as does the Central Intelligence Agency, they do not act as a depository. They turn this material over to the Library of Congress, so that the Library of Congress is the custodian, so to speak, and handles it and makes photostatic copies, films, and so forth.

In your instance, however, the Library of Congress, if it comes across materials that relate to the field of medicine that are relevant to the purposes of the National Library of Medicine, the Library of Congress sends it over to your facilities——

Colonel ROGERS. Yes; they do.

Senator HUMPHREY. And may keep a card on it, and may note it, but attempts to keep a particular, specific type of medical literature within the confines of and under the jurisdiction of and the custody of the National Library of Medicine; is that correct?

Colonel ROGERS. That is correct. We get a large quantity of material from the Library of Congress, including a good deal of material which the Library of Congress receives on international exchange, since they are the body officially designated to conduct exchange activity. When it pertains to the field of medicine, they send it to us, and we incorporate it into our collection.

Senator HUMPHREY. Right. That is what I want to get at, because the Library of Congress is not only authorized, but directed, under statutes, rules, and regulations, to do certain things, or to accept certain materials. And, when they fulfill that requirement, they may very well pass that literature on down, or up to the National Library of Medicine if it relates to your field.

Colonel ROGERS. Yes. We have a similar arrangement with the Department of Agriculture Library. You can well understand that there are areas that come in between these two subjects.

For instance, entomology is of great interest to agriculture. It is also of interest to medical people because of insect vectors of disease, you see. Well, a decision has to be made as to who is going to have the major collection. We have made such decisions. And we try as much as is humanly possible not to duplicate each other.

Senator HUMPHREY. Are you on any interdepartmental committee relating to technical and scientific publications?

Colonel ROGERS. That is where I am flying off to this afternoon, and I am going out to the Battelle Metallurgical Laboratory that we heard about this morning for a meeting tomorrow of a Government committee on just these matters.

Senator HUMPHREY. How do you feel about the National Science Foundation acting as a coordinating instrumentality for our overall governmental program of the scientific and technological or technical data?

Colonel ROGERS. I think it is a very good idea.

Senator HUMPHREY. Do you feel you could work with them under a general coordinating program?

Colonel ROGERS. Yes, sir.

Senator HUMPHREY. Do you know Dr. Atkinson and Dr. Waterman?

Colonel ROGERS. Yes, sir; we have worked closely with them all along.

Senator HUMPHREY. As I understand it, as the plans unfold here, at least as we talk about them, there may be within the foreseeable future an advisory committee within the National Science Foundation on matters relating to the indexing, abstracting, collating, dissemination translating, et cetera, of scientific and technical data and information.

Do you subscribe to that plan?

Colonel ROGERS. Yes, sir; I think it is a good idea.

Senator HUMPHREY. Are you familiar with S. 4039, the bill that was introduced that permits the head of each agency of the Federal Government, to enter into contracts for basic scientific research at institutions of higher education or other nonprofit organizations? That is authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research?

Colonel ROGERS. Yes, sir, but if you do not mind, I would like to leave that for Dr. Smadel to comment on for the Department.

Senator HUMPHREY. Yes, sir.

Now at this time, Dr. Rogers, I want to thank you very much for your cooperation, for your willingness to remain with us and discuss these matters. You have other work to do, and it sounds very important to me, and we will excuse you now.

Dr. Smadel, we have been planning to come out to NIH——

Dr. SMADEL. We would be delighted to have you and the other Senators at any time, sir. Any time that you can, arrange with Mr. Reynolds to tell us when you are going to come out, and we will be most happy.

Senator HUMPHREY. I think every Member of Congress ought to visit the NIH, and having said that, I think I shall practice what I preach.

Mr. REYNOLDS. We are going to find it difficult to get 3 or 4 of them together at one time, the way it looks now, in view of the heavy pressure of legislative duties.

Senator HUMPHREY. We will get some big fight going on in the Senate so that we can take the time.

Dr. Smadel, what is your view of S. 4039, do you have any comment to make? Are you familiar with this bill?

Dr. SMADEL. Sir, my own field at the National Institutes of Health is in the intramural operations, that is the research that is done in Bethesda. This particular bill is concerned with the grant area. That is the business of the other Associate Director, and I cannot reply formally for the Department.

But I can say this, that there is a letter in process to the Bureau of the Budget from the Department about this bill. The draft of this bill as it was originally prepared in part by the National Science Foundation, was sent to the Department, to the Public Health Service, and the National Institutes for review by the Bureau of the Budget. On the basis of our own experience in the granting of funds for research, there were certain comments made on the bill. In examining the present bill, these comments were taken into consideration. It is my understanding that the letter from the Department to the Bureau of the Budget will concur.

Senator HUMPHREY. Dr. Smadel, do you have an exchange program with foreign countries on the matter of scientific data as well

as personnel? I understand you have an exchange of persons in the field of science, in medicine?

Dr. SMADEL. Yes, sir. As far as persons are concerned, we have a visiting fellowship program, which was underway before the Korean war in a small sense. It was stopped during the Korean episode and has just now again got underway.

As a matter of fact, there were some 14 outstanding young scientists from the western countries of Europe appointed during ths spring who were given fellowships to come to this country to work for 1 or 2 years, in a research laboratory of their choice in one of the universities around the country. This program will increase in the next year or so.

I would point out that it will not develop very rapidly in numbers because of the very careful selection of the young men who come to this country. As a matter of fact, there is a preliminary screening of the candidates in a given country by the scientific group that is the equivalent of the National Research Council here. These candidates referred must indicate the lab in which they would like to work and the head of that laboratory in this country has said, "This particular man would be acceptable."

The very high quality of these men means that there are not very large numbers. We hope that perhaps next year we will be able to double this number from Western Europe and begin in one of the other areas, either in Asia, or in Latin America.

We prefer to proceed slowly on this, but we hope that it will be a most useful thing to the United States as well as to our colleagues in other countries.

Senator HUMPHREY. Do you have any exchange program for qualified technical and medical personnel who wish to come to the United States and attend other institutions other than NIH, in other words, attend and work in medical schools, hospitals, and other parts of the United States?

Dr. SMADEL. As a matter of fact, sir, we set as a ground rule for this first group of visiting foreign fellows that we would prefer to have them in universities. But we said, "We cannot really limit our own NIH scientists in this matter by not permitting them to accept those who want to come so, of the first 12 or 14, we shall try to place 2 in Bethesda. And all the others in universities around the country."

It so happened that we had to change this ground rule, which was our own, because quite a number preferred to come to the National Institutes of Health. I believe that there are now 4 scheduled to come this year out of the 14.

Senator HUMPHREY. What is the reason for only 14 besides the fact that you want to be careful?

Dr. SMADEL. It was a little slow in getting started.

Senator HUMPHREY. I am very enthusiastic about this help business, as you know, as an instrument of effectuating what I consider to be an effective foreign policy. I think that with a little more emphasis upon healing people and a little more emphasis on science for constructive purposes, a little more emphasis upon preventive medicine and the improvement of public health, and maybe a little less emphasis upon pacts and alliances that aren't going to work in some areas, we might be doing better. Therefore, since I know that we bring in hundreds and hundreds of officers for training in our military schools, we have them all over—I am for that; I think it may be

necessary, but I want to know why is it that we are so scared, so frightened about bringing in some doctors.

Dr. SMADEL. I don't think we are scared of bringing them in, sir. We began last July. We had authority again to consider this. In the middle of July Dr. John Paul, of Yale, who was one of the outstanding professors of preventive medicine, agreed to make a tour of the major medical centers in Europe to discuss with their academic groups this new arrangement which would make it possible for certain of their outstanding young men to come to this country. He spent several months at it. The selections were made by the Medical Research Council in Britain, for example. They don't make their selections until early in the year. Some of the other comparable research councils in the Scandinavian countries, and in West Germany, made theirs a little earlier. So that in the sheer mechanics, it took a number of months, and it was not really until the 1st of April that the candidates' credentials were in this country for consideration. Actually they were acted upon fairly promptly. The last group to get in for consideration was the British group from the Medical Research Council, because in their mechanism they were delayed about a month or so longer than some of the others.

So that I think you should look upon this as the first crawl, if you will, while we are learning to walk, while we are learning to work with the research councils in the other countries. It will progress. We are a little impatient, too, but we don't want to force it too fast.

Senator HUMPHREY. What about our people going to other countries?

Dr. SMADEL. This is possible. In the medical field, by the use of grants from the Public Health Service, NIH, in the research field; also it is possible with certain of the fellowships that are available through the Public Health Service, NIH.

Senator HUMPHREY. We have a good deal of foreign currency lying around overseas. In fact, $1,340 million worth of it, unused, that we have accumulated from the sale of American agricultural products and we have a substantial amount that we have accumulated as counterpart funds, which was accumulated under an arrangement, as you know, that came along with economic assistance.

This money, in fact, doesn't really belong to us but it is made available to us. I want to use this money. I am a peculiar fellow about money. I think it is really only valuable when you use it. A lot of people sit on it but it never hatches. It has no reproductive capacity without use. And I wondered whether or not your organization, the NIH, had been pressing for action or making any suggestions to the Bureau of the Budget through your Department of Health, Education, and Welfare, for the constructive and prudent use of these foreign currencies which in most instances lose value every year unless they are promptly used.

Dr. SMADEL. To the best of my knowledge, sir, neither the National Institutes of Health, the Public Health Service, nor the Department has pressed for such use as you point out. I have been very much interested in listening to the discussion this morning and reading some of your comments.

There is one point that I would like to ask because I have not yet read the details carefully enough. I would go back to some experience that I had with counterpart funds in the—well, 7 or 8 years ago. I

happened to have an Army Research Unit in Malaya where we went to study scrub typhus and to test what turned out to be the cure for the rickettsial diseases. We were well received by the Malayan Government, so well received that we actually kept a research unit there, and there is one still there. But we realized early that we were crowding the British and Malayan scientists there in their building, and furthermore we were having trouble housing our American physicians and scientists. There was money available in counterpart funds in British pounds which were expendable in Malaya, and it seemed a fine idea to the scientists in Malaya and us, and subsequently to other individuals in the Government, to use some of these counterpart funds, one, for the building of the small laboratory as part of the Medical Research Institute of Malaya where the Americans could work, and use part of this money for the acquisition of housing where the Americans might live.

Well, sir, I spent a great deal of time on this problem and I must say that everyone was very receptive, and we finally got this completely through the military channels, through the British channels and the Malayan, and everything was set. Then it turned out that the Department of the Treasury said, "Yes, you can have these funds transferred to the Army to build these things in Malaya if the British and the Malayan Government would like for you to, but the Army must transfer from its budget its hard dollars to the Department of the Treasury in exchange for these counterpart funds," which, as you point out, were quite——

Senator HUMPHREY. That is true of counterpart funds. But that is not true of Public Law 480 funds.

Dr. SMADEL. That is most important.

Senator HUMPHREY. There is a difference. In section 104 of Public Law 480, as amended, there is a special proviso which exempts the use of the soft currencies or the acquired foreign currencies from the appropriations process of the Congress, and they may be appropriated by the Bureau of the Budget since in fact they are credits to the account of the United States for goods that have already been purchased by public moneys, moneys that have already been appropriated for our excess surplus agricultural commodities.

I want to say you had a noble idea and I want to say that somebody in the Department of the Treasury and the Department of the Army ought to have been on the beam and seen to it that it was done. Those pounds have since deteriorated in value, and all over the world there are these currencies that have lost their value because of the unwillingness or the ineptness of somebody, the unwillingness to lead and the ineptness of some others who had responsibility.

Now, I happen to be rather familiar with this situation. I don't believe I am an expert in many fields, but I staked out this situation to find out all I could about it.

During a trip overseas I found in country after country we had sold agricultural commodities. Vast amounts of Turkish lira, Italian lira, Greek drachmas, and Egyptian pounds, were lying around in every country—pesetas in Madrid—filling the banks with them. Yet I found when I came back they didn't even have a complete tabulation of it. I held up the mutual security program last year by being plain ornery, obstreperous, and obnoxious for a period of time until the Department of the Treasury came over here and listed before the

Committee on Foreign Relations how many dollars worth of foreign currencies we had lying around the world.

The only trouble around here is that everybody likes dollars because they are easier to handle. You don't have to transpose figures, you don't have to dig out exchange values, and it is just a little bit more acceptable a type of currency, but I am of the opinion that a great deal of this foreign currency can be used for the very purpose you are talking about, and my purpose today is to lobby you. In other words, I am——

Dr. SMADEL. I am susceptible.

Senator HUMPHREY. Good. Because I really think this is terrific. When I think what you could have done in Malaya with those British pounds, it just is really very regrettable. It is most unfortunate that it wasn't done because the fact of a clinic or a reasearch institute, the physical fact of it being there, is one of the most important things that we could do.

I was in Cairo last year, about 13 months ago, and I want to tell you that of the two finest things that we have done in Egypt, one of them was a program being conducted by a team of Navy doctors.

Dr. SMADEL. NAMRU–3, yes, sir.

Senator HUMPHREY. They were terrific. I heard from people all over Egypt what these doctors have been doing and I heard a lot of other things that we have been doing that weren't so complimentary.

And the second thing we did that was good was the food that went over there under the CARE program. The rest of it you could have flushed down the drain. It would be better if some other so-called programs had never been authorized.

But those two things really built some good will.

Now, I am sure that we have many reasons for our attitudes about some of the developments in certain countries. In this instance I mentioned Egypt. Mr. Nasser is not always easy to get along with, but I want to tell you this small team of Navy doctors did a great deal of good for this country.

Dr. SMADEL. Only a small group when you were there, sir. It had been quite a large organization and it is building up again. But it is one of the most outstanding laboratories.

Senator HUMPHREY. I wish the American press would report to the American people what a handful of doctors have been able to do, not only in Egypt. I heard about them every place I went. It was unbelievable, but this was true every place. A little good medicine—you take some of these modern miracle drugs and a few medical technicians, nurses, and doctors, and you can do more good than 10 divisions of the Marine Corps. We don't know what to do with troops.

I am pro-Marine Corps, too. I don't want to get in any mess about that. Even Truman couldn't stand up against them.

Dr. SMADEL. Well, medicine is one of the greatest forces in diplomacy.

Senator HUMPHREY. Terrific.

Dr. SMADEL. It is a fact. I would like to finish that Malayan story to show you——

Senator HUMPHREY. Go right ahead. We will get that done.

Dr. SMADEL. Because when we were blocked on that matter, a very unusual thing happened. The British built the laboratory with

their own money and gave it to the Americans. Now, that is quite an unusual twist, and I am very proud of them.

Senator HUMPHREY. It is unusual. Of course, they built it with the same British pounds.

Dr. SMADEL. Oh, yes. They were their pounds.

Senator HUMPHREY. We had those and, by the way, just to end up this little discussion, one of the biggest problems we have overseas is the unused money that is lying around. I mean from our foreign relations point of view. Because the minute that you have large deposits of a native currency in a bank of that particular country, the people look upon you with suspicion. They wonder what you are going to do with that money. You become a target of attack and suspect, just exactly as if 1 depositor in your hometown had about 20 percent of all the money in 1 bank or in 1 company. You kind of wonder all the time, what is that guy going to do? Is he going to withdraw it and thereby have a run on the bank, or sell out and thereby cause a collapse in the price of stocks?

Instead of a well-liked fellow, you get to be the number one public enemy. And I could add quite respectfully that one of the problems of this country all over the world is that we insist on being too rich. We would be better off if we invested that money in some sort of enterprise or some form of public works for our own benefit—and the benefit of others.

I won't go into it any more, but I can take country after country and it would help a great deal.

Well, I welcome the chance to get that said today. The use of medicine and the food are the Humphrey crusade.

Dr. SMADEL. Well, it is a good crusade.

Senator HUMPHREY. We have plenty of medicine available and lots of food, but we insist on sending things to people that they don't want, sometimes.

Anything else you would like to say, doctor?

Dr. SMADEL. Well, sir, this has been most interesting. I haven't said any of the things that I should have said from my notes.

Senator HUMPHREY. Oh, yes; you have. You get on that Department now and tell them to get going on the use of some of these currencies.

Dr. SMADEL. All right, sir.

Senator HUMPHREY. Figure out what to do about it.

Dr. SMADEL. There is one point that I would like to make and that is that there is somewhat of a difference in the communications problems in the medical field from those in the technical and applied sciences field. As Colonel Rogers brought out, there is a long history in medicine of the study and use and development of methods of communication. He discussed primarily the American effect, but I would take note of the fact that the first medical texts go back to Egyptian times and the first medical bibliographies to the 16th Century, and in the intervening years they have developed a whole group of conventional mechanisms for accumulating and disseminating knowledge in the medical field.

There is another difference in the medical literature and that is that medicine and the related biological sciences might be considered as soft in contrast to the hard sciences of physics, geology, and engineering, soft in the sense that the data that is to be recorded in the hard

sciences is generally very precise. In the biological and medical sciences the conclusions and the data are really statistical approximations, not precise values, and the other thing is that there is often dispute in the meaning of words.

I would remind you, sir, of the discussion you had this morning on just what is the definition of a clearinghouse by a number of individuals. This is the sort of thing that one finds all of the time in medicine and in the biological sciences, and with such soft data and disputed meanings, it is difficult to develop and adapt new kinds of methods of recording facts.

Another one of the major differences is in the character of the information. Much of the fundamental information in the medical areas has no possibility of immediate application by industry, by defense, and often not even by other scientists at that particular moment. This information is carefully recorded in the printed record and at some indefinite time in the future it is used.

This means that the economic drive, the tendency to hoard each bit of new information or use it immediately, is not a characteristic of information in the medical sciences, whereas it is the characteristic of some of the other groups.

And finally, in the medical sciences one has a large group of highly specialized people. Each of these groups assumes a very considerable responsibility for the accumulation of knowledge in its own field and in developing methods for recording and disseminating this. So that actually we have probably a hundred medical literatures instead of just one, and with these various differences, then, we find it not quite so simple to develop into the more mechanized procedures.

We believe that we have developed methods that have been applicable and that are still usable. We are not self-satisfied with the idea that there is no improvement that one can look forward to. We continually explore in these fields. But we are cautious in our exploration because we have had a long experience in medicine, and we do have mechanisms that do work. There are somewhat more detailed things that I could discuss with you about the National Institutes of Health and its relation to accumulation of knowledge and transmission of it.

The National Institutes of Health supports the research projects of over 7,000 investigators located in universities and private research institutions throughout the country. A system of 28 study sections, each containing about a dozen senior investigators from research centers in all parts of the country, screens each application submitted. Applications are then referred to the seven statutory advisory councils for their recommendations to the Surgeon General. Through this mechanism, NIH maintains an intimate relationship with the professional scientific needs of a large number of research fields including their communication needs.

One of the earliest needs to be met was that for pooled information on research in progress, to enable any Government agency or responsible investigator to find out what grants have been made for what subjects prior to publication. NIH was an original and a continuing sponsor of this clearinghouse, the Bio-Sciences Information Exchange, now operated under the Smithsonian Institution. The exchange has proved to be immensely valuable in the elimination of unintentional duplication, and in the planning of research commitments.

The various study sections and councils have identified need for the improvement of abstracting services to various scientific groups. On their recommendations, NIH has supported by grant to Excerpta Medica the improvement of abstract services in the fields of cancer, cardiology, and Russian medical literature. Similarly, NIH has supported the preparation of extensive scientific bibliographies; for example those on tissue culture, cancer chemotherapy, psychopharmacology, and others.

Historically, grants in support have been given to Biological Abstracts, to the Chemical Biological Coordination Center, under the National Research Council, for documenting the biological effects of chemical compounds; and to its successor, the cardiovascular literature project of the Division of Medical Sciences, National Research Council.

These are a few examples of our support of specialized communication efforts, the need for which have been identified and endorsed by the study section-council mechanism.

Internally, where our program needs have required more intensive control of information than that afforded by conventional library means, we have established experimental information systems. In this category fall the documentation program of the Cancer Chemotherapy Service Center, conducted by the National Cancer Institute. The purpose of this operation is to document all observed biological effects of chemical compounds tested in the cancer field and to record their effects on tumors. Our Division of Research Grants organizes vast amounts of detailed information concerning the research of the 7,000 grantees, and for this purpose we have established a Data Retrieval Section with a highly developed indexing system. More recently a Psychopharmacology Service Center has been established in the National Institute of Mental Health to meet the special information requirements of the rapidly developing field of drugs used in the treatment of mental illness.

In answer to a specific request from the Senate Committee on Appropriations, we have initiated and developed a program for the translation of Russian scientific research materials in the biomedical sciences. I am submitting a separate exhibit describing this program.

(The exhibit referred to follows:)

LIST OF EXHIBITS SUBMITTED BY THE NATIONAL INSTITUTES OF HEALTH, JUNE 26, 1958

Adams, S. Problems in Communicating Russian Science. Federation Proceedings 16: 716 (September 1957).

——— Medical Documentation as a Study Field. 1957.

——— Facsimile for Federal Libraries. Special Libraries 44: 169 (May-June 1953).

——— Information—A National Resource. American Documentation 7: 71 (April 1956).

Deignan, S. L. The Bio-Sciences Information Exchange of the Smithsonian Institution. A. I. B. S. Bulletin 4: 22 (October 1954).

Endicott, K. F. The Chemotherapy Program. Journal of the National Cancer Institute 19: 275 (August 1957).

Welt, I. D. The World Literature on Cardiovascular Drugs. Bulletin of the Medical Library Association 46: 60 (January 1958).

TRANSLATED PUBLICATIONS

Abstracts of Soviet Medicine.
Bulletin of Experimental Biology and Medicine.
Sechenov Journal of Physiology of the U. S. S. R.

Dr. SMADEL. I can summarize briefly our thinking about the communication problem as it relates to the medical-biological sciences as follows:

1. Scientific communication is a sociological problem not to be solved solely in terms of a mechanistic philosophy. It is the function of many groups of scientists who have different needs, requirements, work habits, and types of information.

2. Workers in the medical sciences have been more amply provided with conventional mechanisms for the storing and retrieving of their information than in any other field.

3. As specialized groups have identified their needs and requested assistance, NIH through its Study Sections and Councils has supported them. As NIH itself has required specialized information systems, it has developed them.

I think it should be said that we shall use our electronic equipment advisedly, knowing well its present limitations for the handling of published literature. Where the data are "hard," as for example in physics and mathematical biology, we expect this equipment to be of great benefit; where we have to deal with the problem of converting imprecise word meanings to a machine language, we shall be proceeding with caution.

I think perhaps you may wish to ask questions of Mr. Adams.

Senator HUMPHREY. I think we will go into that, Doctor, a little later when we pay you a long overdue visit.

Just one question. I refer to a suggestion made by the National Science Foundation for the establishment of a coordinating body for any program to bring a little more centralized direction of the scientific and technical data services. How do you feel about that?

Dr. SMADEL. Well, we have in the past coordinated all of our developments with the National Science Foundation. We would be glad to continue to do so.

Senator HUMPHREY. What do you do about the Library of Congress? Do you have a working relationship with them?

Dr. SMADEL. Not directly, sir. We would go principally to the National Medical Library.

Senator HUMPHREY. Through the National Medical Library.

Mr. Adams, you are the librarian?

Mr. ADAMS. That is right.

Senator HUMPHREY. And I suppose that includes working with the National Library of Medicine as well; is that correct?

Mr. ADAMS. Yes. We cooperate very closely with the National Library of Medicine, sir.

Senator HUMPHREY. You have a library, though, for NIH. I mean a library service for NIH that is related to and supplementary to the National Library of Medicine; is that correct?

Mr. ADAMS. We have out at NIH a highly selected research library giving immediate service to the research needs of the Institutes there.

Senator HUMPHREY. Something like we have here. We have the Senate Library. Of course, it is associated directly with the Library of Congress, but it is here within the immediate area of the Senate so that we don't have to run across the street to the Library of Congress.

By the way, I don't think very many people know we have such a fine library either. It is an excellent library and it is one of the few

places around here where there is some peace and quiet. It is quite remarkable. It is a refreshing of the soul when you go up there.

Mr. ADAMS. I wish we could offer you that in our library, sir, but it is a pretty busy place, a little noisy.

Senator HUMPHREY. You would be surprised how Senators can get quiet in a library. I know this is a very busy place.

Mr. Adams, do you want to make any further comment about the program that we are discussing here, the scientific and technical data services?

Mr. ADAMS. I do have some informational materials, sir, which I should like to hand over to the committee for its study.

Senator HUMPHREY. Briefly what do they relate to?

Mr. ADAMS. For example, Dr. Smadel did not discuss the Biosciences Information Exchange. This is a clearinghouse in the medical and biological sciences which gives direct information service about grants. The grants active——

Senator HUMPHREY. Where is that located?

Mr. ADAMS. This under the Smithsonian Institution. And I have here a reprint descriptive of the services of that organization. We are discussing here a clearinghouse for information on grants in progress before publications have been made.

This is something which the National Institutes of Health have backed from the very beginning by grants to the Smithsonian, first to the National Research Council and then to the Smithsonian Institution.

Senator HUMPHREY. Why is it over at the Smithsonian Institution?

Mr. ADAMS. I am not at all sure of the history of this operation, Senator. Dr. Deignan, who is the Director of the Biosciences Information Exchange, is in the audience. She might be able to provide a direct answer to that.

Senator HUMPHREY. Dr. Deignan?

Mr. ADAMS. Dr. Stella Deignan.

Senator HUMPHREY. How do you do, Dr. Deignan.

When you mentioned the Smithsonian Institution was engaged in this kind of activity, it only reveals again what the subcommittee has been concerned about, the tremendous dispersal of these services and these activities, and then the question comes, Is there anybody that really knows what everybody is attempting to do? That is what I hope the National Science Foundation will get around to knowing.

Dr. Deignan, we welcome you. Will you give us your name and title.

STATEMENT OF DR. STELLA DEIGNAN, DIRECTOR, BIOSCIENCES INFORMATION EXCHANGE, SMITHSONIAN INSTITUTION

Dr. DEIGNAN. I am Dr. Stella Deignan, Director of the Biosciences Information Exchange.

Senator HUMPHREY. What is the Biosciences Information Exchange and how did it get set up?

Dr. DEIGNAN. If I may use the term "clearinghouse" again, the Biosciences Information Exchange is a clearinghouse for two things: To prevent the unknowing duplication of research support by the various Government agencies which support medical and biological research, and to prevent the unknowing duplication of effort in

particular scientific fields by and among these agencies. It is placed in the Smithsonian Institution, which is really an overlord, because the Institution has no granting program. The Exchange is supported by seven other Government agencies, each of which has a program to support medical or biological research, and the Exchange is an independent unit, so that in its operation it does not have the interests of a single Government agency in mind but acts in the interests of all of them.

Senator HUMPHREY. I should think you would be more popularly situated under aegis of the National Science Foundation.

Dr. DEIGNAN. In a sense that is true but, Senator, the National Science Foundation is a granting agency——

Senator HUMPHREY. Yes.

Dr. DEIGNAN. Exactly like the others.

Senator HUMPHREY. But it is also a programing agency.

Dr. DEIGNAN. But it is also a granting agency and for that reason the Governing Board of the Exchange, which is made up of members of all of the seven agencies supporting medical and biological research, has placed the operation in an agency which has no interest in supporting medical research, so that the overall agency——

Senator HUMPHREY. They took on the Smithsonian as sort of a guardian angel and godfather because it didn't have any axes to grind, right?

Dr. DEIGNAN. I think that might be one way of putting it, and also because the Smithsonian Institution is responsible for the dissemination of knowledge.

Senator HUMPHREY. I just think this might be something that would be of interest to look into. I happen to feel that the National Science Foundation needs to be given encouragement, needs to be strengthened and to occupy an ever-increasing role in the field of scientific endeavor on the part of our country and Government. As I sense your program, your service, it is again a kind of informational service, on the one hand, and sort of an auditing service, on the other hand.

Dr. DEIGNAN. In a very brief sense, but may I say that the NSF is one of the agencies supporting the Exchange, and that we have the closest relationships of exchange of information with the Foundation. Also the Foundation has members on the Governing Board of the Exchange.

Senator HUMPHREY. How large a staff do you have?

Dr. DEIGNAN. Forty-two people, of whom eight have doctor's degrees or master's degrees.

Senator HUMPHREY. And what role does the Smithsonian Institution really exercise in relation to your program?

Dr. DEIGNAN. I think that is a very sound question, Senator. Actually the Smithsonian Institution is the agency which receives and disburses the funds for the Biosciences Information Exchange, but does not direct the policy of the Exchange. It is an administrative home. It has some policy direction in that 2 members of the Smithsonian, the Secretary and an Assistant Secretary, sit on the Governing Board with members of the other 7 supporting agencies. But actually we are a project exactly like those supported by grants or contracts from the agencies whose information we are coordinating.

Senator HUMPHREY. I see the role now, but I gather that the reason you are under the Smithsonian is that it is a sort of the gatherer of the moneys.

Dr. DEIGNAN. The gatherer of the moneys and disburser.

Senator HUMPHREY. It is kind of like a United Nations neutral in a pivotal position——

Dr. DEIGNAN. Exactly.

Senator HUMPHREY. To permit an operating group to work without being under the domination of the constituent groups that make the contribution, right?

Dr. DEIGNAN. Exactly.

Senator HUMPHREY. I guess perhaps that is a very smart idea at that.

Dr. DEIGNAN. We would like to have you come visit the Exchange, too.

Senator HUMPHREY. I really would like to. I tell you, the city is filled with wonders. I would like to have some time to take a look at it.

You really operate as a quasi-independent board, don't you?

Dr. DEIGNAN. Yes. We are completely independent, and we are not within the civil service.

Senator HUMPHREY. And you are under the bookkeeping and housekeeping functions or supervision——

Dr. DEIGNAN. Exactly.

Senator HUMPHREY. Of the Smithsonian, and they act as your bankers, so to speak.

Dr. DEIGNAN. Exactly.

Senator HUMPHREY. Maybe that is about as good a place as any to keep it. It works, doesn't it?

Dr. DEIGNAN. It works very well.

Senator HUMPHREY. Good. We won't tamper with it. When we get something around here in Washington that works real well, somebody comes up and says that it is in the wrong place, and it takes 2 years to find out how to get to it after we get a change.

Senator MARTIN. I look to the Smithsonian for many services, but I have been very pleasantly surprised on a number of things that the Smithsonian has within its jurisdiction. I am not in a position to pass judgment on where you should be located in giving this service, but I know it is well taken care of under the Smithsonian.

Mr. ADAMS. May I add one more word, Senator?

Senator HUMPHREY. Yes indeed, Mr. Adams.

Mr. ADAMS. If I am not mistaken, Dr. Waterman did mention the National Science Foundation support of the Biosciences Information Exchange in his testimony.

Senator HUMPHREY. That is right.

Mr. ADAMS. I think there is not a doubt in the world but what this is a successful information clearinghouse that comes under the general coordinating efforts of the National Science Foundation program.

Senator HUMPHREY. I want to ask Dr. Deignan: Do you cooperate with the Office of Technical Services of the Department of Commerce?

Dr. DEIGNAN. Yes; I do. We are both in different fields. The Biosciences Information Exchange is limited to the life sciences, and the Office of Technical Services serves industry and emphasizes what I think Dr. Smadel has referred to as the hard sciences. But, in our area of overlap, we send questions to each other and cooperate. I

have known of Dr. Green's operation from the beginning, and he has of our's.

Senator HUMPHREY. Mr. Reynolds is just showing me here the variety of activities that are to be found under the gentle wings of the Smithsonian Institution. Senator Martin touched my imagination on this, intrigued me on this, and Mr. Reynolds comes up with the proof. There are the functions of the Division of Astrophysical Research. There is a Division of Radiation and Organisms. And there was the Canal Zone biological activities. Then there are some functions under the Smithsonian Institution relating to the International Exchange Service.

I guess those are the main ones, outside of what I thought was there, like the *Spirit of St. Louis*, those old locomotives.

Well, thank you very much.

TESTIMONY OF REPRESENTATIVES OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—Resumed

Senator HUMPHREY. Senator Martin, do you want to ask any questions?

Senator MARTIN. No questions. I would be interested in reading over that part of the testimony that was presented before I got back to the hearing this afternoon. I am very much interested in the work of the Department of Health, Education, and Welfare, and, particularly, the National Institutes of Health. I think you are doing a remarkable service.

Dr. SMADEL. Thank you, sir.

Senator MARTIN. I want to encourage you in every way I can.

Senator HUMPHREY. I am going to invite you, as my guest, to a visit to the NIH.

We are going to hear, in just a moment now, the testimony of Dr. Van Acker, and I understand that he may submit certain testimony concerning the Department of Health, Education, and Welfare and the AEC.

Now, I would only suggest to my friends from HEW, if you can't remain, that you get a copy of the transcript afterward. You may want to make some rejoinder in a written statement or, at least, some supplementary remarks. I mention this because Dr. Van Acker has been kind enough to inform us that he intends to comment, at least to some extent, upon some of the services of the NIH.

Dr. SMADEL. That is very good of you, sir. Mr. Adams and I will wait for Dr. Van Acker's discussion and either comment then or submit a statement, if that is indicated.

Senator HUMPHREY. We are very grateful to you. Again I want to extend to you the same comments as I give to the others. It is a source of gratification and genuine pride to those of us who work in the Government and are part of this country and Government to see what is going on at NIH and out at that great library. It is wonderful. And it is you people who are entitled to the credit for the accomplishments and for this grand job of dedicated service. I want to compliment you.

Dr. SMADEL. Thank you very much.

Senator HUMPHREY. That goes for you, too, Dr. Deignan.

Dr. DEIGNAN. Thank you very much.

Senator HUMPHREY. Now, we have Dr. Daniel G. Van Acker, who is president of the Associated Technical Writers, Inc., of New York. Dr. Van Acker gave us a copy of his statement. I shall let you proceed according to your own wishes.

STATEMENT OF DR. DANIEL G. VAN ACKER, PRESIDENT, ASSOCIATED TECHNICAL WRITERS, INC.

Senator HUMPHREY. I may have to step out of the room momentarily to doublecheck on a matter that was just brought to my attention. Senator Martin is here, and he is my compatriot in this entire effort. So, when I step out, you are in much better hands.

Dr. VAN ACKER. Thank you, sir.

Senator HUMPHREY. I shall be right back. You go right ahead.

Dr. VAN ACKER. By way of introducing myself, I should like to state that I am a physicist and the technical director and president of the Associated Technical Writers, which is wholly engaged in the business of technical and scientific translation from and into various foreign languages.

Much of its normal activity is devoted to performing this type of work for private industry but, currently, it is engaged in translating, under my direction, a total of between 1 and 2 million words of papers submitted to the forthcoming Geneva Conference on the Peaceful Uses of Atomic Energy from the foreign languages, mainly French and Spanish into English, since the Russians have supplied the United Nations with their own English versions.

During the war years, I helped organize, under the authority of United States Army officers, the Translation Branch of the Adjutant General's Department, which adapted, translated, or otherwise worked on some thousands of Army technical and field manuals for the Allies who were getting lend-lease equipment.

Thus, for the last 16 years—both in the service of the Government and outside—I have been devoting the whole of my time and, on occasion, this concept may be extremely elastic or generous, and mean, as it currently does, anywhere from 16 to 18 hours a day—to the processing of scientific and technical material from one language to another.

Now many things, in the course of these many hours, have become very clear to me and, with the committee's kind permission, I should like to submit them to its attention.

In the first place, it is my considered belief that we have a dual purpose to perform. We do not merely have to secure all the information we can about the efforts, if I may quote the very distinguished Senator who just went out for a minute, about the efforts of all other countries in the scientific and technical fields by the device of translating their material into English for evaluation and utilization by interested scientists. But we also have to impart information pertaining to our own efforts to the outside world in at least the major languages of the world.

In the second place, I must say that I very forcefully disagree with some of the past testimony to the effect that there is no need for the translation of very substantial amounts of foreign language scientific material from various foreign languages into English. There

is indeed such a need. It is a crying one and the time to solve the problem is now.

What is more, we have all the talent needed in this country to perform a very good job.

Senator HUMPHREY. Just a minute. At this point, Doctor, I want to see if I clearly understand your statement and what I believe to have been the statement of the CIA witness. I mean, wasn't that the witness?

Dr. VAN ACKER. Yes, sir; that was one of the statements.

Senator HUMPHREY. Yes. In that instance, as I recall, the witness from CIA, was Mr. Borel or Colonel Cain. The statement was made that insofar as the needs of the intelligence community was concerned for those documents and materials in foreign languages that were required for their needs, they were not short of the manpower or the services to make the translations.

Now, they then went on to amend that, after Senator Martin interrogated them—I can see the Senator coming right up after them saying this is an unusual event; when somebody doesn't say they need something here—and then in response to Senator Martin's question as to their requirements, I believe that Colonel Cain responded that for the priority items they were all right, but there was still a great deal yet to be done.

Is that a fair interpretation of your memory, Senator Martin?

Senator MARTIN. Yes.

Senator HUMPHREY. Now you are saying, as I understand your feeling, that the statement was made by one of the witnesses, one or more of the witnesses, that there was adequate translation personnel.

You develop that point as you see it.

Dr. VAN ACKER. Yes, sir. Well, my feeling, of course, is that there is a great need for more translation than is being done now, that there is a considerable amount of material, all over the place, which is sitting there merely for the lack of sources or the apparent lack of sources.

My feeling is that we have the sources in this country but we have not yet exploited those sources to the full. What does happen in many instances is that some Government facilities proceed in 1 of 3 ways which to my mind are somewhat erroneous.

In the first place, they go to sources which perform translations as a side activity, as it were, such as research and development facilities, engineering facilities, some universities. I mean a number of sources whose sole activity is not translating. That is one way which I don't think is too sound.

The second is that they proceed themselves to look for individuals who can go about it, whereas the third way is simply to go to established sources whose sole profession it is to perform technical translations.

If they were to do that, they would find that there are several—I will not say there are many but there are several throughout the country which are perfectly competent to help them for, I would say, most of their requirements. Of course, I do not presume to say that I know what all their requirements are, but for most of those that are known to me on the strength of, I suppose, a normal ghost of commonsense, I would say that they have the possibility of finding access to very adequate sources.

Senator HUMPHREY. The point was made, I believe, with some validity, Doctor, validity, may I say, to my view, in my mind, that in some of these technical fields, highly technical fields that I only hear about and do not know about, that if you are going to get a translation that has all the nuances and all the expressions within it that really fit the vocabulary of that particular discipline, you should go to not merely a person that is competent in the language but also a person that is competent in the skill and in the discipline or the profession as well as the language.

I think there is a great deal of merit to that. It is exactly like a person translating the language, let us say, of French without knowing the axiomatic expressions, and if you don't know the colloquial and axiomatic expressions, you just can't translate the language any more than you can the English language. In that instance, I believe it is good to shop around, but I think it was stated here by other members of the committee, and I would surely subscribe to it, that where there are these private competent professional translation services where a specialty has been developed in this area, that it would be prudent on the part of a Government agency to contract out for these translation services rather than to try to recruit and compete for a limited supply of competent personnel.

I don't know. I think Senator Martin developed this point in our earlier hearings at some length and I surely subscribe to it.

Dr. VAN ACKER. I would like to add, if I may, Senator, that I am delighted to see that the views which I first printed in 1945 are being warmly upheld by so distinguished a Member of our Senate as you, sir. My first article on the subject in 1945 pointed out in effect to the very thing you just stressed, and very rightly so, mainly that obviously the problem there is not by a long shot merely a problem of language. That is why it is my feeling that it has to be solved usually by teams, because you just don't have enough qualified scientists to go around, but teams in which a good scientist, competent to express himself and communicate; is at the head of the group, all of those members may not necessarily be completely competent. But, however, who has a team that can work together under the editorship of such a leader, and incidentally, under an editor worth perspicuity of expression and the like or purely a language editor, whether this be English or any other language.

This is definitely a thing for teamwork and that is why it is my feeling that we have the teams in this country. We don't have quite as many as we should have, but they are developing and, of course, as the demand grows, no doubt they will continue developing.

If I may return to my statement, sir, as I recall, we have had good translators and the scientific ones all along just as we have had uranium, for example, all along.

As I recall, it used to receive—that is, uranium—some attention, some measure of attention, for example, for such arts as pottery, if I remember, for some colors. I think you could get some rich blues out of some uranium.

The competent technical translators now are as much in demand as uranium, for different purposes, to be sure, but they are like uranium ore. They are here and they have been here all along, but they have received all too few applications.

The Government can do very much to change this situation provided a certain number of changes are made in current procurement policies. Now, it is of prime interest, in my humble estimation, to the Government, and to the country to develop a competent force of scientific and technical translators, right here in the United States. This can be done and should certainly be done.

Another way in which it can be achieved is by taking the low-bid philosophy out of Government procurements, centralizing these procurement operations in competent specialized hands, and dealing with reliable, competent established sources rather than with what I might call translation brokers and organizations which engage in translation as a sideline.

Under the low-bid philosophy and the very broad current definition of what makes a qualified bidder, some picturesque situations, to say the least, will develop. In the few cases where there are negotiated bids the situation is not much better.

There are two cases I have here of illustration. In 1955, just after we finished doing about 600,000 words of abstract submitted to the first Geneva Conference, we were requested to bid—it was a sealed bid, lowest qualified bidder by the AEC right here in Washington. We dealt with Mr. Paul Feinstein.

Now, what had to be done was to translate into English the proceedings of sessions held at the U. S. S. R. Academy of Sciences, which in July of that same year, 1955, had called a conference of the satellite nations in order, as it were, to steal the thunder from Geneva.

Quite by accident we discovered that these proceedings already had been translated by the Consultants Bureau, which were offering the books for sale to various AEC installations. We felt the whole thing must be an oversight. Surely the AEC was not inviting sealed bids to the lowest qualified bidder for the performance of which which had already been performed.

So, we drew Mr. Feinstein's attention to the matter, and nevertheless the invitations were sent out to several sources, including Consultants.

Repeatedly we pointed out that this made the whole bid a sorry farce, that the logical thing to do was to offer some royalties or other payments to Consultants for the use of their work, but most assuredly not to request them to bid against others to perform that which they already had performed.

Procurement went on, nonetheless, and they received an award for about $5,000. Several protests were of no avail, and Consultants even were improperly apprised of our criticisms, which certainly were not directed against them, by an unknown or unknown persons in the service of the Government, in such a distorted manner that they, Consultants threatened us with a slander action.

In my answer to Consultants Bureau's attorney, I made it very clear that I had at no time criticized them as such, but I should go on fighting such procurement practices on the part of AEC or any other Government agency, and I have now redeemed this pledge.

I should like again to make it very plain for the record that I continue to believe that Consultants Bureau were in no way to blame. I do greatly criticize and resent the manner in which Mr. Feinstein and later Mr. Fry, when we protested the award, completely ignored these protests.

Many other procurements have since then been made by the AEC in Washington, and we have been excluded from them. Just recently we were asked to edit some material by a successful bidder for some work for AEC, but some people at AEC wanted to have us edit this particular bidder's work so we would have ended up editing our own editing.

Now, as regards negotiated bids, I should like to draw the committee's attention to a curious, to say the least, type of material.

The Air Materiel Command of the Air Force at Dayton, Ohio, has considerable requirements for translation of technical material from various foreign languages into English. In 1952, following many years of efforts just to be called in as bidders, we finally were recognized. The bid included a sample translation to qualify the bidder, in particular one from Polish to English. One of the other bidders who was not competent to translate the sample piece asked us, not knowing we were bidders, to do this for him. We obliged. We inserted a gross mistake for identification.

Now, that year, not that year, but the one after, he was a successful bidder. Now, we need not add that, in the meantime, we had sent many protests calling the attention of all interested personnel to the complete unsoundness of the procurement in which a bidder is asked to compete against himself.

All of our protests were of no avail. The Air Force then proceeded to investigate the Air Force and, surprisingly enough, it found that the Air Force was entirely right.

I should like to submit to the attention of the committee a copy of an editorial which I wrote for the bilingual publication of the Association of Spanish Copywriters and Translaters of New York, of which I am the first president not native to the Spanish language.

This is a story of some length. If it please the Senators, it might be placed in the record. I will just make it available.

Senator HUMPHREY. Yes, indeed.[16]

Dr. VAN ACKER. This article establishes that it is not possible to perform a service of quality required for less than about $30 per thousand words. Now, my colleagues of the association criticized me for writing this article, with some bitterness, for showing such a low figure. I am inclined to agree with their criticism, but the amount is again a bedrock minimum, not as a fair price. And yet, gentlemen, if you please, if you investigate the prices at which much of this material is being awarded in Government contracts, you will find that a great deal of it goes for much less, meaning that no competent technical translator can make a full-time career of his chosen profession.

Therefore, gentlemen, knowingly or unwittingly the Government of the United States is depressing the rates at which this work is performed, thus discouraging the development of the full-time activity of professional technical and scientific translators.

A number of nonprofit organizations, a number of universities, a number of design and engineering firms, and a number of institutions whose relation to translation at times is very remote are now in the translation business.

[16] The document entitled "GACETA," published by the Spanish Copyrighters and Translaters, Inc., was retained in the files of the subcommittee.

A number of persons who are employed full time otherwise are stretching out their inadequate pay by performing translation services on the outside.

Now, there is nothing inherently wrong or evil in this, of course. Yet it is downright degrading for university professors who should be so well paid as not to have to engage in any commercial activities outside, to do so; and our great universities, to my knowledge, which I deeply respect, are not commercial enterprises.

And please see, gentlemen, how much substantial appropriations have been made by such institutions as the National Science Foundation to very well-endowed and otherwise affluent institution such as universities for this kind of work.

What is wrong to my mind is not all that but, of course, it is that legitimate professional bidders expected to bid on a so-called competitive basis against sources to which it cannot possibly fight on fair terms.

I submit to you, therefore, gentlemen, that legislation is in order along the following lines:

One: Provide for the possibility of Federal grants-in-aid to the businesses legitimately engaged in full-time technical and scientific translation work when they are of proven ability and of proven usefulness to the Government.

Two: Create a central procurement facility which will proceed to evaluate all sources available, excluding those which are not engaged in translation as an exclusive and full-time activity, and grade them on the basis of a point system in which allowance is made properly for the price without making the determining factor out of it.

Now, this facility would procure all translations for all Government branches and activities and the awards would go in mandatory fashion to the sources which show the best point counts. If it would be of any interest, more at leisure, I have designed a possible point system. I do not for a minute submit it as the last word, but it is some sort of a guide to what such a point system could be, and the Senators might be interested in it.

Three: I believe the legislation should establish proper protection against unfair foreign competition in order that United States sources be required to apply the "buy American" clause of the Smith Act to the purchase of translations and all ancillary services. This could readily be achieved by an amendment to the Smith Act to include all services.

Currently, for instance, there is nothing in the act which debars the source from obtaining an award and then proceeding to have the work performed overseas. Of course, this usually applies only to unclassified work, but it stands to reason even so that complete loss of control by this country is not good.

Shall we call this protectionism?

Of course, we shall. And it is protectionism to my mind of the soundest type, not in favor of established industries, which probably do not need very much, anyway; but, rather, in favor of helping develop a profession which the country sorely needs.

Finally, we should establish protection for the translation businesses against unfair discrimination on the part of some Government installations.

For example, the Astoria, N. Y., facility of the Signal Corps, which is concerned with the production of foreign-language motion pictures for the Armed Forces, in the person of Mr. Canepa, and his superiors, has consistently refused to consider our firm, and no doubt other sources of supply, by stating blandly they prefer to work with individuals.

The whole operation of this facility, namely, the Astoria, could most profitably be investigated for it is my understanding that it uses United Nations' personnel, and most assuredly this is quite unnecessary as long as reliable sources and firms of proven competence offer their services.

Some of the translation procurement practices of the National Institutes of Health have been a matter of some concern to us.

As regards the application of the "Buy American" clause to printing, which, unlike translation, per se, is even now covered by the act.

On a very recent procurement, however, we indicated that we should bid only if the "Buy American" clause applied, and we received a telegram from the institutes to this effect: so that as long as the awardee, Pergamon Press or Pergamon Institute, I believe is having all its printing performed in the United States in compliance with this clause in the law, there is no question at all in our mind as to the nature of the procurement by the Institutes of Health.

This was the burden of my comment on it.

I have again these examples, gentlemen, merely to illustrate the difficulties encounted with the present system.

That it should be reformed very radically and in toto is not open in my mind to much discussion. Once it is reformed, we shall find that the vast amount of latent talents available will come to the fore and we shall quickly develop this force of competent technical and scientific translators we so badly need in this country.

I personally do not share the view of some of our pessimists. We have the talent.

This, as so many novel enterprises is something which the United States can and will do extremely well once the Government starts cooperating with those who are in the pursuit of their own professions, trying to do what part of the job they can. This is not a matter of what and who, but certainly one of how.

I am confident the job can be done and will be well done right here at home and right soon.

Gentlemen, I wish to thank you.

Senator HUMPHREY. Have you ever been consulted by the National Academy of Sciences or the National Science Foundation with reference to your views on this subject matter?

Dr. VAN ACKER. No, sir.

Senator HUMPHREY. Have you done much translating work for the Federal Government?

Dr. VAN ACKER. Very little, sir.

Senator HUMPHREY. You have security clearances?

Dr. VAN ACKER. Up to and including "secret" and a request to apply for "top secret" at any time it be necessary.

Senator HUMPHREY. When you say "very little" translating for the Federal Government, what do you mean?

Dr. VAN ACKER. Well, sir, I mean on the basis of our yearly activity, for example, which runs to—it fluctuates a bit. This year

would be a very good year, thanks to the United Nations. It runs from anywhere from 2 million words a year, should we say, to four or five.

I should say we have performed in the last few years an average of, well, one hundred, two hundred, or three hundred thousand for the Federal Government. Very many installations in the Federal Government know us well. We have contacted them a great many times. We have been, on rare occasions, invited as bidders and have been told, Well, your bid is too high.

We have also been invited to negotiated bids, by this Dayton installation, the Air Materiel Command, and never progressed very far. They probably did not agree with our view that bidders should not compete against themselves.

So we were somewhat annoying, I guess, and troublesome. So, we never got anywhere with them. And, generally speaking, we have not had much activity for the Federal Government.

The CIA, at one time, was in conversations with us and they indicated that one of their gentlemen in the field area in New York City would go and look at our facility and satisfy themselves regarding our clearance. That was about 3 years ago. That was the last we heard of them, and, apparently, they are in need of the service since the CIA has indicated that need.

Senator HUMPHREY. It is my view that your point about low bidder has a great deal of merit. I mean, it isn't just a matter of price that is involved here. It is a matter of competence; a matter of the timeliness of the service, quality of translation. There are many factors involved.

When you get away from the low bid concept, you run the risk of getting into some trouble; but we do have procurement officers who negotiate bids and are under continuous public and congressional scrutiny, as well as by the General Accounting Office and other auditing services.

I believe that point is well taken. It is something that we ought to look into.

By the way, Senator Martin, in light of the charges or the allegations that have been made here with reference to a couple of the agencies of Government on procurement practices, it seems to me we ought to ask our staff to look into this.

I should like, if you agree, Senator, to ask Mr. Reynolds to designate someone from the committee staff to really look into these charges or statements, because I have no reason to doubt what you say is accurate—that if found to be true, it is something that ought to be corrected immediately.

Dr. VAN ACKER. I think so, sir.

Senator MARTIN. I should think it would be advisable to consult with the departments referred to here.

Did you serve directly under the Department officials who worked in the Department of Defense during the war?

Dr. VAN ACKER. From 1942 to 1946, sir?

Senator MARTIN. Yes.

Dr. VAN ACKER. Yes. I was an employee.

Senator MARTIN. How long?

Dr. VAN ACKER. From 1942 to 1946.

Senator MARTIN. Were you in this translation work as a director in any way during that time?

Dr. VAN ACKER. No. I was called senior technician. I don't know what that is, exactly. In effect I was—I think we ended up by having what we call two cocivilians in charge.

Senator MARTIN. They were within the development for that work?

Dr. VAN ACKER. Yes, sir.

Senator MARTIN. They gave that their full time, full time to it in Government employ?

Dr. VAN ACKER. Yes, sir; from 1942 to 1946.

Senator MARTIN. We didn't do very much contracting out at that time, as I remember.

Dr. VAN ACKER. No; the Department did little.

They did do some, not much.

Senator MARTIN. Our expansion was very rapid and we couldn't expand the forces rapidly enough to keep up with our needs.

Dr. VAN ACKER. Quite right.

Senator MARTIN. But at that time we had the policy of trying to do it ourselves and we found the job grew beyond our capacity to do that. You will remember that experience.

Dr. VAN ACKER. Oh, indeed, yes.

Senator MARTIN. I was on the Military Affairs Committee during those years and I had close observation of the expansion.

The years you were there started out with a very small organization and it expanded very rapidly.

Dr. VAN ACKER. Quite so. You no doubt, sir, will recall our commanding officer of the translation branch of AEG, Col. Leon Norris, who, I should like to state for the record, did a prodigious job, taking precisely a very small section and developing it into a branch in which there were 250 technicians, let alone the ancillary personnel, and admirably done.

Senator MARTIN. All of this type of service expanded so rapidly we could not hope to keep up with it in our own personnel. We had to let some of it out. That was not just in this field, that was in many fields akin to this. We faced some serious shortages.

Now, following the war we undertook to expand a bit more in the matter of contracting this work out. Now, from your testimony I gather that you feel such contracts should be entirely negotiated contracts rather than bid contracts.

Dr. VAN ACKER. In substance, sir, but if I may stress that point, what I believe would be most significant as an advance in procurement would be the establishment of a central facility, because under the present dispensation, for example, inside one Government's facility—take the case of Oak Ridge installation of AEC, for example.

Now, Oak Ridge National Labs as such do some contracting and the Union Carbide Co., which works as a contractor for Oak Ridge, as you know, does its own and separately.

Now, there is a very curious amount of overlapping in that. Now, we work currently for Oak Ridge through Union Carbide. However, Oak Ridge as such is also procuring on other sides, and so on.

So inside one installation, you have two parallel avenues of procuring.

On the other hand, take the subject of interest to you, Senator, particularly the Armed Forces. Now, I know that at times the Artillery School at Fort Sill, Okla., is interested in obtaining some highly specialized translations, for example, on some aspects of ballistics.

Now, it will procure out of Fort Sill. Now, I don't know, there may be a great deal of people around Fort Sill who are competent to do the translation of difficult problems of external and internal ballistics, say, from Russian and German into English, but my impression is that it is not too likely that there are. It would, therefore, be better for the procurement to be concentrated, say, right here in Washington, in a facility which would develop a completely impartial system of evaluation of the sources and would then apply this yardstick.

Senator MARTIN. Do you think we could create an agency of that kind that would be adequate for our needs and stay within the bounds in the overhead costs of maintaining it?

Dr. VAN ACKER. I believe, Senator, such an agency would be purely——

Senator MARTIN. You are talking now about the whole thing, not just military. You are talking about the entire field.

Dr. VAN ACKER. Oh, yes, indeed. But I am talking purely of a procurement facility. I am not suggesting a facility that would be——

Senator HUMPHREY. Centralized procurement.

Dr. VAN ACKER. Yes. In order to specialize it in the hands of—concentrate it in the hands of a few specialists. It would be a small facility, I am quite sure.

Senator MARTIN. That would not require such——

Dr. VAN ACKER. I have made tentative designed and management charts. It wouldn't be anything very large.

Senator MARTIN. It would require considerable supervision, of course.

Dr. VAN ACKER. That is right.

Senator MARTIN. To take note of some of the situations you described in your testimony here.

Senator HUMPHREY. I hope that you will be able to submit to the subcommittee information relative to any instances where any contract has been let that turned out to be inadequate or improperly fulfilled to a low bidder, or contracted to a low bidder, which subsequently had to be redone.

Dr. VAN ACKER. Yes, sir. I had such an instance.

Senator HUMPHREY. Thank you very much.

Dr. VAN ACKER. Thank you, sir.

Senator HUMPHREY. We will have any documents or anything that needs to be placed in the record in the hands of Mr. Reynolds. Also the replies of the agencies which have been brought out in this testimony as allegedly guilty of some inefficiency.

Senator MARTIN. I am very much interested in your suggestions. We will need further information.

Dr. VAN ACKER. Of course.

Senator MARTIN. And if you will cooperate with the staff in any further reference to these items you have discussed here, we on the subcommittee would appreciate it very much.

Dr. VAN ACKER. I certainly will.

Senator MARTIN. We do want to look into your recommendations very carefully. We have every reason to want to build up a good procedure for handling these matters. We have a great many highly talented men working in this field and I should think that they could correct any things that need correction without too much trouble, but we need your counsel as to the things you have observed so that we may be on the alert. That is the main service you are rendering here, to bring our attention to these instances that you have recited in your prepared statement.

If you can submit additional information, or statement, regarding the details of any contract that you have observed, we suggest you do that concerning them. That will be helpful to our staff.

Dr. VAN ACKER. I will be glad to.

I would like to point out, if I may, too, that I hold no animus whatsoever against anybody. I came out with no preset judgments myself. I solely observed and reported some findings which indicated at least oddities in the operation of the present system.

Senator MARTIN. We appreciate that very much, and it is in our interest to go carefully into the matters you have brought to our attention or may bring to the attention of the staff.

We want to thank you very much for your cooperation in coming here as a witness.

Dr. VAN ACKER. Thank you, sir.

Senator MARTIN. If there are no other witnesses scheduled, this closes the hearings on this matter except for the submission of material requested.

Dr. VAN ACKER. Of course, I will do so to Mr. Reynolds.

Senator MARTIN. And other witnesses called on to do so, should submit additional material. That is the general request of the subcommittee.

(Whereupon, at 4:45 p. m., the hearing was concluded.)

(The additional information requested of Dr. Van Acker was not furnished to the committee. Communications received by the subcommittee from the National Institutes of Health and the Atomic Energy Commission, in response to the testimony of Dr. Van Acker, and other material submitted for insertion in the record follows:)

MECHANISMS USED BY THE NIH RUSSIAN TRANSLATION PROGRAM FOR JOURNAL TRANSLATION [17]

By Scott Adams, Librarian, National Institutes of Health

In carrying out the request of the Senate Committee on Appropriations to "make available to American scientists the full findings of Russian scientists," [18] the National Institutes of Health, with the advice and assistance from the scientific community, selected eight basic science journals in medicine and biology for cover-to-cover translation and publication. These journals were:

(1) Biokhimiia (Biochemistry).

(2) Biofizika (Biophysics).

(3) Biulleten' Eksperimental'noi Biologii i Meditsiny (Bulletin of Experimental Biology and Medicine).

(4) Fiziologicheskii Zhurnal SSSR im. Sechenova (Sechenov Physiological Journal of the USSR).

(5) Problemy Gematologii i Perelivaniia Krovi (Problems of Hematology and Blood Transfusion).

[17] See also p. 447.

[18] U. S. Senate. Committee on Appropriations. Report on Departments of Labor, and Health, Education, and Welfare, appropriation bill, 1957. 19 p.

(6) Voprosy Onkologii (Problems of Oncology).
(7) Voprosy Virusologii (Problems of Virology).
(8) Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii (Journal of Microbiology, Epidemiology, and Immunobiology).

The journals were selected on the basis of the following criteria:

(a) They represented broad areas of basic research (as opposed to medical practice and clinical medicine), which might be productive of new or unfamiliar theoretical and experimental information;

(b) They represented areas in which American experimental biology and medicine is vitally interested (biochemistry, biophysics, physiology, cancer, virology);

(c) They represented areas in which individual Russian investigators have a demonstrated competence recognized by the scientific community.

The objectives of the NIH Russian translation program were: first, to bring about the translation and republication of these journals; and, second, to insure their widest possible distribution to those segments of the American scientific community most intimately concerned with the exploration of these fields.

To a very considerable extent, this public coincides with Public Health Service grantees (over 7,000 in number) who conduct independent research in academic and other private research centers throughout the United States. By making these translated journals available to the libraries of the institutions in which medical research is concentrated, NIH would act to provide grantees with information which would enhance their productivity, and at the same time reach investigators who were not grant supported. Anticipating multiple use of copies of these journals deposited in the libraries of tax-supported and/or nonprofit research institutions, the NIH hoped to reach 90 percent of the American medical scientists mentioned in the Appropriation Committee's report.

At the same time, it was recognized that individual scientists, separate laboratories of complex research organizations, and others might wish to subscribe, and that the high cost of translation discouraged them. Accordingly, another NIH objective was to achieve a sales price to the general scientific public which would insure the widest possible commercial distribution of these translated journals.

This latter objective was all the more desirable, since NIH did not contemplate indefinite support of the journals. Rather it has viewed this program as an emergency one, designed to correct a temporary deficiency in world scientific knowledge brought about by a series of historical and social circumstances. After a period in which American scientists have a full opportunity (hitherto closed to them) to evaluate the Soviet contributions, and to familiarize themselves with the lines of Russian medical research and the names of individual Russian scientists conducting it, the representatives of the American scientific professions themselves will be in a better position to determine the weight of Russian contributions. NIH, therefore, has not contemplated support of these translated journals beyond a 5-year period, at which time those which have gained acceptance are expected to be commercially viable.

The problem, therefore, was one of achieving maximum distribution and maximum opportunity for evaluation of the significance of Russian experimental work in the shortest possible time. This aspect of the NIH translation activity took on some of the characteristics of a crash or impact program.

To do this, NIH decided to distribute the journals without charge to the libraries of tax-supported and/or nonprofit medical research institutions, and enlisted the help of the Medical Library Association, the national professional organization of librarians of such institutions, in designing a distribution list of 300 names. To this was added, by invitational letters sent to the Surgeons General of the Army, Navy, and Air Force, the Chief Medical Officer of the Veterans' Administration, and the Division of Biology and Medicine, Atomic Energy Commission, a further 100 names representing the research installations of these Government agencies.

Three basic mechanisms were available to the NIH to bring about the translation and republication of these journals:

(a) Grant,
(b) Purchase contract,
(c) Service contract.

Grants

The National Science Foundation follows a practice of making grants to nonprofit professional organizations, which in turn contract for the translation and publication of journals.[19] This procedure has much merit in that it enlists the

[19] Odette, R. Science, 125: 579 (1957).

interest and support of the organized scientific community from the beginning. The making of such grants without regard to Government printing requirements is specifically authorized by law (Public Law 507, 81st Cong., 2d sess., sec. 11 (g)).

At the outset of the NIH program, this possibility was investigated. An informal opinion from the Office of the General Counsel, DHEW, pointed out that without comparable authority to that assigned to the National Science Foundation, the "use of the grant technique in such a way as to make the grantee in effect act as a contracting agent for the Government would present difficulty." Furthermore, Government printing requirements (44 U. S. C. 111; 42 U. S. C. 1870 (e) and (g)) would apply to the publication of the contemplated translated journals. The possibility of third-party contract was therefore abandoned.

Purchase contract

Two of the translated journals, Biochemistry and the Bulletin of Experimental Biology and Medicine were already in being at the start of the program. These were the property of Consultants Bureau, New York City; the translations had been copyrighted by Consultants Bureau, and they were offered for general sale at $95 each. Respecting the proprietary rights involved, NIH purchased for distribution 400 copies of each of these 2 translated journals. By informal agreement, the proprietor reduced the sales price to the general public to the same figure paid by the NIH: $20 per year.

Service contract

The remaining six journals were not in existence in translated form. Their production involved the procurement of both translation and publication services.

SPECIFICATIONS

While cold-type processes have advantages of cheapness and speed, these same factors have caused near-print publications to be equated in scientists' minds with temporary or throwaway materials. To insure preservation, and to provide the translated journals with the same format adopted by the better American scientific journals, NIH specified letterpress on quality paper.

Illustrations, especially photomicrographs of such subjects as cancer cells, contain much information for the scientist. They are meaningless if their quality is poor. NIH specified, therefore, the reproduction of all photographic illustrations contained in the Russian journals from the original halftone cuts, or from the original glossy photographs.

This requirement, admittedly difficult, and implying an agreement, commercial or otherwise with the original Russian publisher, has been criticized as a hardship to a contractor. In point of fact, it is a scientific necessity in order to convey accurate scientific information.

Delivery requirements were also specified, originally 30 days after the publication of the Russian originals, amended in the second year's contract to 90 days. While no penalty clause for nondelivery within the specified time was made, the NIH contract read: "Failure to make shipments within this time for 2 successive months will be considered a basis for cancellation of the contract by the Government."

Scientific accuracy, suitability, and quality of the translations was a prime consideration. NIH requirements were: "All translations shall be in smooth, undistorted scientific English, and shall be lucid rather than literal. Technical and scientific terminology shall be selected with a view to appropriateness and acceptability within the subject field of each journal. Where sciences have devised standard nomenclatures, such shall be used."

ADVERTISING (1957 CONTRACT)

The contract for the 1957 issues of the six journals (Invitation 331–1–3–57) was sent to the following agencies after a careful review of firms with both translating and publishing potential. Identical sample pages from the Russian journals were sent to all potential bidders so that the quality of work might be checked.

Consultants Bureau
Excerpta Medica Foundation
Pergamon Institute
Columbia Technical Translations
Associated Technical Services
Educational Services
University of Washington
International Visitors Center, Inc.
Bertrand Languages, Inc.
Scientific Russian Translation Service
Charles A. Meyer & Co.
Translations, Inc.

Bids were received from the following firms:

International Visitors Center, Inc.	Pergamon Institute
Consultants Bureau	Excerpta Medica (3 titles only)

The sample translations were carefully reviewed both by a senior program assistant with 20 years of professional scientific translating experience, and by scientists at the National Institutes with a knowledge of Russian.

Consultants Bureau was low aggregate bidder ($76,000), with Pergamon Institute next ($78,000). The sample translations submitted by Consultants Bureau, however, were inept and inaccurate compared to those submitted by the Pergamon Institute, and it was judged that the low bidder did not comply with the translation quality specifications of the bid invitation.

The contracts for the translation and publication of the six journals (SA–43–ph–1596 [SPO 12666] and SA–43–ph–1686 [P. O. 16196]) were awarded to the Pergamon Institute, a nonprofit organization with offices in New York and London.

PERFORMANCE

Performance on such a contract would require the assemblage of a large group of qualified translators, with advanced degrees in the subject fields, the organization of a highly skilled editorial group, and the provision of large-scale press facilities. Moreover, it would require the establishment and smooth functioning of operating agreements with the appropriate Russian agencies.

The National Institutes of Health is satisfied that the Pergamon Institute performed satisfactorily under these two contracts.

On the point of quality of translation, sample issues of the Pergamon journals were carefully checked by Dr. Sidney Glaser, special adviser on translations for the House Subcommittee on Government Information (Representative John E. Moss). As against one instance where one inexperienced translator made errors, Dr. Glaser described one complete issue of one of the journals as "brilliant," and satisfied both himself and the House subcommittee on the quality of the work.

On the quality of presswork and appearance of the printed journals, all recipients are in agreement that they attain high standards (see sample copy attached).

Only on the speed of delivery has there been room for criticism. Capt. I. R. Maxwell, executive secretary of the Pergamon Institute, has informed the NIH in answer to our inquiries that the delays were due to circumstances out of his control; that the Russian supply of advance copies and glossy photographs for reproduction assured by members of the Academy of Sciences U. S. S. R. were from time to time interfered with by the Ministry of Trade, resulting in unavoidable delays.

The following is a schedule as of June 1, 1958, of journal issues for the year 1957 published by the Pergamon Institute under these contracts:

Title and total Russian issues	Number of issues published by Pergamon	In press	Edited for press
Biophysics (6)	3	3	
Journal of Microbiology, Epidemiology, and Immunobiology (12)	4	5	3
Problems of Hematology and Blood Transfusion (6)	3	3	
Problems of Oncology (6)	3	2	1
Problems of Virology (6)	4	1	1
Sechenov Physiological Journal of the U. S. S. R. (12)	8	2	2

The NIH has assurances that the Pergamon Institute will complete performance under these contracts by July 1, 1958.

In view of the manifest difficulties of predicating press production on agreements achieved with one agency of the Russian bureaucracy, and in view of the satisfactory performance of the Pergamon Institute in regard to quality, the NIH did consider but decided against invoking the cancellation clause in the contract.

1958 CONTRACT

The continuation contract for these same six journals was advertised for bid on March 31, 1958. Some changes were made. Since experience had shown that the total number of pages to be published by the Russians could not be

accurately predicted, the bid rate was based on the cost per page of Russian text. Similarly, delivery time was extended to 90 days.

In the interest of insuring a uniform product from one year to the next, the specifications called for physical conformity to the journals already published by the Pergamon Institute.

Again, invitations to bid were sent to all firms known to have translating and advertising potential. The list of invitees follows:

(1) Consultants Bureau
(2) Pergamon Institute
(3) Excerpta Medica Foundation
(4) Language Translation Service, Cleveland, Ohio
(5) Associated Technical Writers
(6) Primary sources
(7) Interlingual International Inc., Carmel, Calif.
(8) International Engineering Research Institute
(9) Research Information Service
(10) Columbia Technical Translations
(11) Associated Technical Services
(12) Academic Press
(13) Technical Information Service

One firm, the Associated Technical Writers, Inc., of New York City, had objected to the award of the original contract on the grounds that the Pergamon Institute was a nonprofit concern in unfair competition with profitmaking organizations.

This firm was assured that the NIH contract award would be made only on the basis of open, competitive bidding, and it was expressly included on the list of invitees for the bid.

During the period that the invitation was out, the Associated Technical Writers, Inc. made further representations that the procurement of Russian original journals and photographs would jeopardize their firm in relation to the security translation which it was providing for another agency of Government under contract, and that this was, therefore, an unfair requirement. To this, the reply was that two of their competitors did not find it so.

This firm also asked whether it was NIH's intention to include the provisions of the Buy American Act in evaluating the awards. The NIH answer was affirmative, since the Buy American Act is a standard provision of any contract.

In a further telephone communication, the Associated Technical Services represented that due to prior commitments they would not be able to bid on all six journals. In point of fact, no bid whatsoever was received from this firm before or after the opening date.

Bids were received from the following:

	Bid per Russian page
Pergamon Institute (5 titles)	$18
Pergamon Institute (1 title)	16
Language Translation Service	19
Consultants Bureau	22
Research Information Services	25

The contract for the second year was accordingly awarded to the Pergamon Institute as low responsive bidder.

APPLICATION OF THE BUY AMERICAN ACT

The application of this act (41 USC 10 (a)–(d)) is subject to several considerations as detailed in Executive Order 10582.

The first point to be determined is whether the end product to be bought—in this instance published scientific journals—is of foreign or of domestic origin. If over 50 percent of the materials and services are of foreign origin, the act applies.

In the case of the Pergamon Institute, which manufactures its journals in the United Kingdom, and whose translating and editorial staff is centered in London, NIH agrees that the end purchased product is of foreign origin.

The second point is the provision of the 6 percent differential (par. (b) and (c) of Executive Order 10582) which permits the purchase of a foreign product in the national interest when the price is lower by 6 percent or greater than that of the domestic supplier.

As to the bids for the 1957 contract, the following took place: International Visitors and Excerpta Medica eliminated themselves because of high bids. Consultants Bureau was eliminated because of noncompliance with the specifications for translation quality. That made the Pergamon Institute's bid of $78,000 lower than the next responsive bidder's figure (International Visitors' bid of $268,000) by approximately 300 percent.

Of the bids submitted for the 1958 contract, the Pergamon Institute's bid (average of $17.66 per page) was less by 7.1 percent than that of the next lowest bidder (Language Translation Service).

In both instances, the price differential exceeded the 6 percent figure and it was judged to be in the national interest to accept the bid.

PERGAMON JOURNALS (UNDER NIH CONTRACTS)

1957 issues, as of June 15, 1958:
- Biophysics (6):
  - 1–3: Published (January–June).
  - 4: Printing.
  - 5–6: Setting in type.
- Journal of Microbiology, Epidemiology, and Immunobiology (12):
  - 1–4: Published (January–April).
  - 5–8: Printing.
  - 9–12: Setting in type.
- Problems of Hematology (6):
  - 1–3: Published (January–June).
  - 4–5: Printing.
  - 6: Setting in type.
- Problems of Oncology (6):
  - 1–3: Published (January–June).
  - 4: Printing.
  - 5–6: Setting in type.
- Problems of Virology (6):
  - 1–4: Published (January–August).
  - 5: Printing.
  - 6: Setting in type.
- Seehenov Journal of Physiology (12):
  - 1–8: Published (January–August).
  - 9–10: Printing.
  - 11–12: Setting in type.

1958 issues (translated):
- Biophysics, 1–2 (January–April), 256 pages.
- Journal of Microbiology, 1–4 (January–February), 642 pages.
- Problems of Hematology, 1–2 (January–April), 126 pages.
- Problems of Oncology, 1–2 (January–April), 256 pages.
- Problems of Virology, 1–2 (January–April), 129 pages.
- Seehenov Journal of Physiology, 1–5 (January–May), 503 pages.

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington, D. C., July 17, 1958.

Hon. HUBERT H. HUMPHREY,
Chairman, Subcommittee on Reorganization, Committee on Government Operations, United States Senate, Washington, D. C.

DEAR SENATOR HUMPHREY: In accordance with the conversation between the Commission's representatives and your staff director, Mr. Walter Reynolds, at the conclusion of the hearings before your subcommittee on June 26, 1958, the AEC desires to submit the attached statement for the record in response to the allegations concerning the Commission made by Dr. Daniel Van Acker before the subcommittee on that date.

Generally, he alleged that the AEC in contracting for the translation of Russian scientific information had duplicated work already translated commercially and that the invitation to bid on this contract was a "farce"; that his protests against this procurement were ignored; that a competing commercial firm was improperly informed of his protests; that as a result of his protests he was excluded from bidding on subsequent AEC translation contracts; and that major operating contractors of the AEC do overlapping translation work.

The AEC denies contracting for translations which had previously been performed, and also denies that Dr. Van Acker's protests were ignored or that he has been excluded from bidding on AEC contracts and finally denies that there is any duplication or overlapping whatsoever in AEC or major operating contractor translation work.

In general, these same allegations were made by Dr. Van Acker to the Senate Select Committee on Small Business early in 1956. At that time the Commission by letter of May 2, 1956, transmitted to Senator John A. Sparkman, committee chairman, a documented report which we believe completely refutes Dr. Van Acker's allegations. We presume this report, with all of its accompanying papers, is available in the files of that committee.

The statement here attached is directed specifically to the allegations recently made before your subcommittee.

We would be happy to supply any additional information that the subcommittee may desire.

Sincerely yours,

JOHN S. FOSTER, *General Manager.*

STATEMENT OF THE AEC IN RESPONSE TO THE TESTIMONY OF DR. D. VAN ACKER, ASSOCIATED TECHNICAL WRITERS, JUNE 26, 1958, BEFORE THE SUBCOMMITTEE ON REORGANIZATION, COMMITTEE ON GOVERNMENT OPERATIONS

The United States Atomic Energy Commission denies any improprieties, discrimination, unfairness, or inefficiency in the matter of contracting for translations work as alleged by Dr. Van Acker (transcript of hearings, June 26, 1958, pp. 700–702). The same allegations with regard to AEC's publicly advertised bids and contract award for the procurement of the translation of the Proceedings of the U. S. S. R. Conference on the Peaceful Uses of Atomic Energy were made by Dr. Van Acker to the Senate Select Committee on Small Business in early 1956. At that time the Commission, by letter of May 2, 1956, transmitted to Senator John A. Sparkman, committee chairman, a documented report which we believe completely refutes Dr. Van Acker's allegations.

Each of his allegations is here considered in order and followed by our statement of the relevant facts, citing applicable portions of the 1956 report to Senator Sparkman.

1. Dr. Van Acker alleged that the U. S. S. R. conference proceedings had already been translated by Consultants Bureau- and thus the Commission's invitation to bid was a "farce" (transcript, p. 701). At the time this contract was awarded, work had been done on only 1 of 5 volumes. Contrary to his statement before the subcommittee, the translation was far from complete. Furthermore, as noted in our 1956 report:

"It was determined prior to the contract award that the fact that Consultants Bureau had this translation underway did not disqualify them as a bidder under standard Government procurement rules."

2. Dr. Van Acker alleged that his protests to AEC were of no avail and Consultants Bureau was "improperly apprised" of his criticisms "in such a distorted manner that" Consultants Bureau "threatened" Van Acker "with a slander action" (transcript, pp. 701–702). The pertinent facts are quoted from our 1956 report:

"The bids were opened and read at a public opening. Two bidders were present. When the low bidder called the AEC to ascertain why the contract had not been awarded to him, he was informed that a protest had been filed and told of the general nature of the protest, he was advised that the award was being withheld until the protest was evaluated. Neither the name of the protestant nor the specific allegations included in the protest were revealed. In our judgment the lowest bidder had a right and the AEC had an obligation to inform him of the general reasons for the delay in the award. We do not feel that communication to the low bidder of the fact of the protest in light of the delay in the award was inaccurate, false, or prejudicial."

3. Dr. Van Acker does not appear to be fully accurate in stating before the subcommittee that he "had at no time criticized Consultants Bureau," that he "believed that Consultants Bureau were in no way to blame," and that his protests to AEC "were certainly not directed against them" (transcript, pp. 701–702), since his letter of December 12, 1955, to AEC protesting Consultants Bureau's eligibility as bidder included the following comments:

"It is again requested that the Consultants Bureau be disqualified as bidders for the following reasons:

* * * * * * *

"They have produced the translation in violation of some clauses of the Smith Act (it is requested, in particular, that the principals state, under the penalty of perjury, that they have not purchased any part of the translation work outside the United States).

"* * * it is not quite understood how their qualifications can be ranked equal, for instance, to those of this firm * * *"

4. Regarding Dr. Van Acker's further statement to the subcommittee concerning the Consultants Bureau contract, to the effect that his protests were completely ignored (transcript, p. 702), we refer you to Mr. Bernard M. Fry's letter of December 29, 1955, copy attached, which was in direct response to the points raised by Dr. Van Acker at that time. (This letter was among the exhibits included in our report submitted to the Senate Select Small Business Committee.) Included in the 1956 report is the following comment on this same allegation:

"Copies of the letter of protest dated December 12, 1955, and the reply by Mr. Fry dated December 29, 1955, are attached as annex 4 of this exhibit. We believe it will be seen on examination that Mr. Fry's letter was responsive to the questions raised by Dr. Van Acker of Associated Technical Writers, Inc., dealt with them in a factual manner, and was written and sent in good faith."

5. Contrary to Dr. Van Acker's testimony before the subcommittee (transcript, p. 702), his firm has not been excluded from bidding on subsequent AEC translations contracts. In fact, Associated Technical Writers has been solicited and has responded to each invitation to bid issued by the Commission.

(*a*) The first invitation, No. 401–57–53c, was issued December 30, 1957, and bids opened on January 17, 1958. The following telegram was received from Associated Technical Writers:

"Re your invitation No. 401–57–53c. Regret due to pressure of business unable to submit bid in short time allowed for preparation costs. Kindly keep us on bidders list."

Thirteen bids were received in response to this invitation.

(*b*) The second invitation was 401–58–82c, issued on April 1, 1958. Bids were opened on April 25, 1958. The following telegraphic response was received from Associated Technical Writers (dated April 14, 1958):

"Deeply regret that due to commitments for atoms-for-peace conference are unable to avail ourselves opportunity to bid on large program before end of August 1958. Many thanks for courtesy of extension on bid 401–58–82c."

(*c*) The third invitation, 401–58–95c, was issued on April 22, 1958, and bids opened May 12, 1958. Associated Technical Writers bid $1,500 for the job. Bid was awarded to Chemical Translating Services, Palo Alto, Calif., in the amount of $492 for the job.

(*d*) As recently as May 1958 the Commission solicited translation proposals for a particular item urgently required for the forthcoming Geneva Conference, and in June 1958 Associated Technical Writers was awarded the contract upon the basis of a low proposal.

6. The allegations by Dr. Van Acker concerning an unspecified editing job on page 702 of the transcript are difficult to pinpoint. The headquarters staff has been unable to locate any "AEC people," either in headquarters or field offices, who asked this firm to edit any material on an AEC contract. We can assure you that the AEC people directly responsible for awarding the contract to the successful low qualified bidder did not contact Dr. Van Acker to edit the material involved.

7. The reference to two different groups in Oak Ridge interested in translation work simply reveals Dr. Van Acker's lack of knowledge of AEC operations generally (transcript, p. 715). It is mistakenly assumed that the Oak Ridge National Laboratory and the Union Carbide Nuclear Co. are separate contracting entities—Union Carbide is the AEC contractor operating Oak Ridge National Laboratory. Most translation work is arranged for directly by major operating contractors of the AEC to meet their specialized needs. The AEC itself arranges for translation of large monographic works of interest to atomic-energy programs generally, which no one else has translated. Again, we can assure you that there is no duplication or overlapping whatsoever, but, to the contrary, the AEC has developed a system whereby AEC laboratories and contractors are automatically informed of material which has been translated, which is in process of translation, and which is being actively considered for translation. This information is regularly printed in the form of lists which are circulated to all AEC contractors, other Government agencies, and foreign governments which have agreements for cooperation with the United States Government. Furthermore, this information is reprinted by the Central Intelligence Agency and circulated throughout the intelligence community.

8. Generally, we would like to point out for the information of the subcommittee that in the award of contracts a number of factors, such as standards of quality, competence of bidders, timeliness in completing the job, have been taken into account as well as low bids. The AEC safeguards quality by requiring samples from all bidders, or requests bidders to translate excerpts from the material to be translated. Finally, in order to assure technical accuracy of the material translated, each piece is reviewed by a person competent in the subject field.

ANNEX 4, EXHIBIT A

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington, D. C., December 29, 1955.

Dr. DANIEL G. VAN ACKER,
President, Associated Technical Writers, Inc.,
New York, N. Y.

DEAR DR. VAN ACKER: This is in reply to your letter of December 12, 1955, regarding the invitation to bid for the translation into English of the five volumes embodying the papers submitted to the Moscow Conference on the Peaceful Uses of Atomic Energy. Your views have been given the most careful consideration and it has been concluded that the Atomic Energy Commission should award this translation contract to Consultants Bureau.

The fact that Consultants Bureau had this translation underway would not disqualify them. As far as we have been able to determine, this undertaking was wholly upon the initiative of Consultants Bureau as a private commercial venture, and was not undertaken at the suggestion of the AEC or its representatives.

Your assertion that the Consultants Bureau is guilty of unfair competition as a result of getting translations accomplished outside the United States does not provide a legal basis for the AEC to disqualify them. The only relevant statute, the "Buy American Act," applies only to procuring supplies, not services, outside the United States. Only services are involved in this contract.

Accordingly, it has been concluded that in light of the fact that Consultants Bureau is the low bidder and has met the qualifications set forth in the advertisement for bids, the Atomic Energy Commission properly awarded the contract to Consultants Bureau.

We wish to thank you for submitting your bid.

Sincerely yours,

BERNARD M. FRY,
Acting Chief, Technical Information Service.

UNIVERSITY OF CALIFORNIA,
RADIATION LABORATORY,
Livermore, Calif., May 14, 1958.

Hon. HUBERT H. HUMPHREY,
United States Senate,
Washington, D. C.

MY DEAR SENATOR HUMPHREY: You are correct in assuming that I am greatly concerned about lack of support of work in meteorology in the United States. I am a member of the Committee of the National Academy of Sciences which concerns itself with meteorological questions. The Chairman of this Committee is Lloyd Berkner, Associated Universities, Inc., 10 Columbus Circle, New York City.

Our Committee has recommended expanded work on meteorology in existing institutions. It also has stressed particularly the need for a national institute which is to concern itself with the science of the atmosphere. A recommendation to this effect was presented to Dr. Killian on February 5 of this year. I have no information whether any further action has taken place.

I believe that work on meteorology may turn out to be vital both in our present contest with Russia and in the more important context of developing our power over nature for the benefit of mankind. I am therefore very grateful that you gave me this opportunity to express my concern.

Sincerely yours,

EDWARD TELLER, *Director.*[20]

[20] A report, Research and Education in Meteorology, prepared by the Committee on Meteorology, National Academy of Sciences—National Research Council, dated January 25, 1958, is incorporated in the files of the committee.

HARVARD UNIVERSITY,
DEPARTMENT OF CHEMISTRY,
Cambridge, Mass., May 20, 1958.

Hon. HUBERT H. HUMPHREY,
The Senate of the United States,
Washington, D. C.

My DEAR SENATOR HUMPHREY: Although I have been living in Cambridge, England, for the last few months I have kept somewhat in touch with the study of science support in the Federal Government conducted by your subcommittee and I was in general agreement with its conclusions. If there are copies of the full report available, I should like very much to have one.

I have prepared for discussion with several groups a draft of my own criticisms of our national science effort and policy. These are enclosed in the event that your committee may still be interested in these matters and has time to examine individual contributions.

Finally, I must offer my congratulations to you on the excellent job you have been doing in this area and in successfully taking on the AEC in matters where it has erred.

Very sincerely yours,

PAUL DOTY, *Professor.*

MEMORANDUM ON FUTURE SUPPORT OF BASIC SCIENCE IN THE UNITED STATES OF AMERICA

Paul Doty, Harvard University, Cambridge, Mass.

INTRODUCTION

We begin with the fact that for more than a generation about 1 in 400 of our young people receive a doctor of philosophy in science. The scientific community of which they become a part now numbers roughly 150,000. Within the span of a few years circumstances have brought this community of scientists into the center of our national life. In a democracy such as ours one can only expect Government officials to act conservatively, making neither terribly serious errors nor exhibiting any real power of initiative. At best they can respond slowly to public pressures allowing a very modest evolution to take place within the framework of our national traditions. By contrast scientists through their discoveries and developments repeatedly alter our conceptions of the universe, affect our pattern of living, and swing the military balance of power. Indeed without a certain frequency of discovery and invention on their part we are now certain to fall behind in the titanic struggle with communism.

With nothing less than national survival dependent on the competence and deployment of our scientists it is to be expected that questions concerning their function in and support by the Nation must come under almost continuous examination and discussion. Let us then examine some aspects of the function and support of scientists as it has existed over the last decade and draw some conclusions with regard to changes that should be made. Then we can return to the problems of quality of scientists and their deployment, or the organization and effectiveness of our scientific effort.

FUNCTION

I assume that the involvement of the scientific community with our national life and destiny is so thoroughgoing and the work of the scientific community so dependent upon financial support from the whole society that the obligations of our scientists to the Nation and of the Nation to the scientists cannot be other than very great. If through misunderstanding or apathy either side lets down the other, we are headed for national oblivion. But granted that this does not occur, the assessment of the mutual obligations and their continuous evolution will involve a great many choices concerning not matters of black and white, but value judgments that may well be linked to political philosophy. In this way it seems to me inevitable that science policy will become a matter of partisan debate and quite properly so. However, it is only within the past year that we have seen anything resembling an aware and articulate debate of what our present science policy should be. In the decade just past our national science effort has been for the most part a jerry-built affair dictated largely by pressures for development programs to attain short-range objectives. With the large funds available to the military establishment and industry the consequence has been a constant

depletion, in at least a relative sense, of our effort in basic scientific research. The first decision in the development of a national science policy must be on the question of whether or not the present balance of personnel and financial support between basic science on the one hand and applied science and development on the other is a wise one.

I believe it is obvious that it is not. The best exposition of this point I have seen was in an article by Fred Hoyle in the New York Times magazine section about last December. The main point is that the vigorous growth and development of the society requires a continuous injection of new ideas and knowledge at its base. This is what basic scientific research provides. At just this time when our own support of basic research is contracting, relative to the total research-and-development effort, our backlog from earlier times has become exhausted and the output from Western Europe has fallen off. If the gap is to be filled it must be from our own efforts.

SUPPORT

The problem of the support of science involves not only dollars and cents but conditions under which they are supplied and the effectiveness with which they are distributed and used.

A generous estimate of the current annual cost of all scientific research and development in the United States of America now reaches nearly $6 billion; that is, nearly 2 percent of the gross national product. The division between basic research and applied research and development that has arisen over the last decade apportions about 7 percent of this to basic research.

The number of scientists engaged in basic research can be estimated at about 14,000 (9,000 in universities and 5,000 in governmental, private institutional and industrial laboratories). Thus our lifeline of basic scientific research consists of an annual flux of less than $0.5 billion and the efforts of less than 10 percent of our scientists.

Having raised above, but not settled, the question of whether an adequate fraction of our scientific manpower is engaged in basic research we can turn to the question of whether the financial support of the scientists that are so engaged is sufficient. On the basis of the above figures the annual expense of a scientist engaged in research is about $30,000. This is divided into three main categories: Salary, laboratory maintenance, and direct research costs including assistants. This figure is approximately $10,000 lower than several industrial laboratories have quoted as their annual research-and-development cost per doctor of philosophy. Likewise it is about $10,000 less than the corresponding figure for applied research and development deduced from the estimates made above (i. e., 5,600,000,000/136,000=$41,000).

The important conclusion from these considerations is that money is spread a little thinner in basic research, but that the total cost (about 0.4 billion per year) is an extremely small figure on a national scale, that is, about one-tenth of 1 percent of the gross national product. Consequently, if there is doubt that basic research is not adequately financed the cost of saturating its needs will not significantly affect the national budget. Indeed when its importance is appreciated this course does not seem unreasonable. From discussions with many scientists one gains the strong impression that a doubling of their research support would adequately provide them with the conditions they need for optimal execution of their work. Providing an increase of this amount and studying the most effective means of distributing it should be the immediate concern of the Government.

The National Science Foundation is already undertaking somewhat more than a doubling of its research-grants budget and even larger increases in graduate fellowships. However, this covers only about 5 percent of the support of basic science (1958 fiscal year) and there appears little likelihood that the support for the other 95 percent will be significantly increased. It is this latter fact that makes the current increases in the NSF support appear to be inadequate for the national need unless they are repeated each year for several years.

ORGANIZATION OF SCIENTIFIC EFFORT

If an adequate funding of basic scientific research does now become possible the pattern of the support is due for a long, hard look. During the past decade the principal sources of new funds for basic research (NSF, NIH, and ONR) have been used for (*a*) research grants of approximately 1 to 3 years' duration and amounting to $10,000 to $15,000 per year and (*b*) to provide graduate and post-doctorate fellowships (ONR excepted). At present there is every indication that

additional funds that become available will be distributed in much the same way although NSF has asked for some funds for creating new institutes, providing very expensive instruments and providing matching funds for some laboratory construction.

The wisdom of merely multiplying the number of short-term research grants and fellowships must be judged against how well this pattern of financial aid has worked in the past decade. The following criticisms can be made although some may not be due entirely to the pattern of support.

1. The production of doctors of philosophy in basic science has fallen far below that for doctors of philosophy in applied science, in social science, and humanities as well as that expected in basic science on the basis of past growth patterns (Science 127, 682, 1958). For example, between 1941 and 1955 there was a 162 percent increase in the production of doctors of philosophy degrees in all subjects. Physics did no more than follow the average increase. Mathematics and biology increased only about 135 percent. Chemistry, which makes up about 20 percent of the scientific manpower increased only 63 percent. By contrast in applied subjects we find that engineering increased 490 percent and medical sciences 262 percent. Thus the present support program in basic science has not succeeded in even maintaining the proportion of students in basic science that had existed earlier without such support.

2. Now it is very doubtful that more fellowships (NSF plans a sixfold increase in the 1959 budget) will reverse this trend. Yet the situation is acute. In chemistry there has actually been an absolute downward trend in doctor-of-philosophy production for the last 8 years. In physics this appears to have set in 4 years ago. The opportunities for self-support during this period for competent (but not fellowship-grade) graduate students has not been lacking. They have been attracted away for other and more complex reasons. In my opinion this has to do with the attractiveness of careers in basic research rather than in the relative opportunities of support during graduate work. This brings us to ask what is wrong with career opportunities in basic research.

3. Since most basic research is carried out in universities we must look there first. While openings for a new doctor of philosophy interested in a career in basic research are ample he is well aware that at the end of the period in which he must prove his ability in independent research (6 to 10 years) there are very few tenure openings in insitutions that have established traditions of high regard and encouragement of competent basic research. This situation exists for two reasons: (1) The increase in tenure positions in basic science since the war has been extremely small, probably not enough to make up for the increased teaching load. At the same time the additional duties and committee work of tenure professors has enormously increased. Thus the positions to which he can aspire are very few in number and even if reached may not permit adequate attention to basic research.

For example, my colleagues and I estimate that in chemistry there are only about 20 American universities where one can confidently expect to have a successful research career in a stimulating environment. Indeed this group of universities is nearly coincident with those that beginning graduate students with NSF fellowships (allowing them free choice of institution) select. The frequency of making permanent appointments within this group is about once in every 3 to 4 years. Consequently each annual class of 1,000 doctors of philosophy in chemistry can look forward to 5 or 6 permanent university openings in really desirable institutions. The odds are not attractive except for a very few.

It follows from this and for other compelling reasons as well that our greatest need lies in increasing the number of tenure positions in universities where the conditions for making a career in basic science exists. Whether this be done by increasing the number of such positions at universities that are already attractive in this sense or by building up departments in other universities that are not is probably a secondary question and best left in part to the vigor of individual departments. But that it should be done is a clear essential. Yet no progress in this direction is apparent. The offering of money on a matching basis for the endowment of research professorships in which teaching would be limited to a single course would probably be the most direct and useful solution to this problem.

4. Another difficulty that overlaps with the one just discussed is the heavy teaching and administrative loads that prevent many professors from effectively pursuing a successful career in basic research. In most colleges and universities the responsibilities of orthodox teaching are given full recognition but productivity in research, the essential condition of preparing students for careers in basic

science, is considered a purely secondary matter and left to the chance initiative of a few. Such institutions are not fertile grounds for a new Ph. D., since his teaching load is almost certain to be heavy and much energy must be expended on maintaining a high quality in his teaching since this will be of dominate concern when he is evetually considered for promotion to a tenure position.

The situation at most universities where research is actively fostered may not be much better for the young instructor or assistant professor for quite different reasons. Here he is submerged in a group of distinguished researchers whose research areas automatically become the focal point of local scientific interest. The young instructor is asked to learn the art of teaching, participate in the routine duties of departmental life, initiate a research program that would better be chosen as different from the area of his doctorate work and not too close to that of any of the established professors. To initiate a successful program that will attract research students in a short time on small funds under these conditions is unlikely and his development in this critical period is thwarted.

This detailed accounting has been made to demonstrate the magnitude of the hazard that faces a young doctor of philosophy in search of a university career in basic science. It is no wonder that most promising young doctors of philosophy prefer to do postdoctorate work at first. While this avoids facing up to some unpleasant facts of life it only postpones the period in which he must face the test of proving whether he is or is not a sufficiently independent, original researcher to merit one of the half dozen positions for which he may compete.

Even if the expansion in tenure positions urged in the previous section came into being the conditions outlined here clearly call for reform if the best young scientists are going to be able to win recognition in time to be considered for permanent appointment. A great improvement would result if 3-year investigatorships were available in large numbers for persons wishing to enter the academic competition. These would be awarded no later than 1 year after the awarding of the doctor of philosophy on the basis of research promise. The salaries should be at least as high as instructorships at better universities, say $6,000. The appointments should be once renewable at a higher salary. The recipients could go where they could find accommodation and they could teach one semester course per year if invited. The award should provide ample funds for their research and a payment to the university for facilities. This sort of scheme, rather than more annual or biannual postdoctorate fellows, would greatly improve the attractiveness of trying for a career in basic science and would go a long way to insuring that a deserving person can win independent recognition in research by the age of 30.

The expansion in the number of permanent university professorships urged here for the purpose of making more careers in basic scientific research possible can be defended quite directly in terms of providing the most effective way to expand our basic scientific research.

There is no more obvious waste in the present scene of scientific research than in the increasing pressure put upon our top thousand scientists to undertake more and more activities that draw them away from their raison d'etre, the engagement in basic scientific research. The jobs they are asked to do need doing, but seldom at the cost of further neglect of their scientific research. The only solution is to expand the number of positions which will attract men of this caliber so that there is a larger group among which the teaching, committee work, refereeing, governmental consulting, editorial duties, and a dozen other services can be divided. This does not call for the creation of research institutes but a broadly based influx of funds into universities for professorships and the support of the research that the filling of these should initiate.

5. The manner in which money is currently distributed for the support of research expenses other than fellowship support is open to several criticisms. The most serious, of course, is that there is not enough to distribute. Three years ago when it became possible for NIH to triple its research grants it was widely feared that sufficient projects would not be forthcoming to justify the use of the money for this purpose. In actual fact it is widely agreed that within 1 year the amounts requested for work of caliber equal to that previously supported had been made and the expansion had continued. So many scientists have become accustomed to scaling their research to fit modest sums that the potential for productive research when fund limitations do not exist is seldom explored or appreciated.

The NIH has within the last 3 years been better able to meet the requests for research funds made upon it than other Government agencies and its practices in this period of relative plenty have been for the most part commendable. Most

important of all the applicant is generally given what he requests if he is given anything at all. Thus for those whose proposals are assigned high enough priority the research can be executed under conditions which they have specified. Other agencies, particularly the NSF, appear to have gone far toward the other extreme of offering a fraction of what was requested and setting an upper limit for the size of the grant that forces an unnatural uniformity on the size of grants that bears very little relation to the wide range of capabilities and individual needs of the applicants.

The duration of grants is generally much less than that requested and the time between the submission of the request and the delivery of the money is much too long, often more than a year. These are serious criticisms and point up the high cost of using an elaborate review system that attempts to evaluate in detail precisely what the investigator is going to do. While such critical analysis may be justified for applicants of questionable ability it serves little purpose for established investigators or for beginning investigators on whom a chance simply has to be taken. Add to this the enormous cost in time to hundreds of our best scientists who serve on review panels and one sees the enormously high price being exacted by these procedures. Within a few years an investigator usually establishes his worth in the scientific market and it becomes known to his colleagues. Once this stage has been reached he should, on each request, be placed in a given priority on the basis of his scientific reputation and promise and awards made in the amount requested as far down the list as prudence justifies. With a few years of operation under this system it would become well known if the investigator's productivity matched his further requests and priority assignments of future requests could take this into account. Again, the benefits to be derived by saturating the funding of research by promising or proven investigators will far offset, in value of the basic knowledge gained, the additional budgetary expansion required, an expansion that will surely remain insignificant in the scale of the national budget.

If the criticisms and arguments presented in this section and the preceding one are correct the current conventions of supporting basic scientific research by increasing fellowship and grant money is incorrect and fundamental modifications along the lines suggested are needed. But more than modification is needed. Research is carried out in laboratories which need maintenance, renovation and replacement. New laboratories must be provided. The Research Facilities Act which has supplied $30 million per year for 3 years in matching funds for research laboratories on a matching fund basis has demonstrated that this method of distributing the money is a good one. Similar and larger acts are needed to cover all of basic science on a permanent basis.

6. We come finally to the vexing problem of degree of support that the Federal Government should offer in different fields. At present the National Science Foundation is administering its general funds in such a way that the broad subdivisions of science are covered in proportion to its own gage of the importance of each. However since this covers at present only 5 percent of the costs of basic research (although next year it may be 10 percent) this policy does not affect most basic science support. Almost all other sources of research funds, including NIH, ONR, and other governmental agencies, cover only certain areas and it is by no means obvious that this bias on the distribution of research funds is the wisest possible for the Nation's interests. This uncoordinated situation leads to pressures developing favoring some fields and neglecting others. As a consequence progress at the frontiers of science is being regulated by budgetary decisions that take no view of what constitutes a properly balanced deployment of scientific effort. To develop such a view will in any event be difficult and will be subject to error. But this means that it will have to receive intense study and continuous surveillance by those most qualified, the leading scientists and governmental officials responsible for the Nation's science policy.

Most scientists instinctively reject the suggestion that any attempt be made to organize and direct our scientific effort. This attitude is understandable and correct when it implies that the work of proven, or even promising investigators in basic science should be guided by some remote board of senior scientists. But this attitude ignores the large areas in both basic and applied science where decisions are being made currently that dictate the allocation of scientific effort without concern for the relative need of such work in comparison with other alternatives. We have in this decade reached the point where the number of possibilities open for investigations for the first time clearly have surpassed the manpower and facilities available for their exploration. The gap will continue to grow. Of course, those scientists of proven ability should be left free to work where they will and a suitable number of others should be similarly unrestricted, but some-

where within our national scientific effort reason must be applied to the problem of what areas are most appropriate for exploration by those scientists who have not found their way to the forefront of the scientific advance.

For example, it is quite obvious that thermonuclear power offers possibilities beyond the imagination of man. Here is an area that should be attacked at both fundamental and practical levels with great intensity. It is almost certain that our present efforts are inadequate. Yet who is to assemble the evidence and rationally decide what fraction of scientific effort should be in this area? Difficult as the matter is, are we justified in allowing it to be decided by default and a rejection of reason? We should look to the National Academy of Sciences for advice on such matters and an expression of awareness of the jungle of problems into which we are racing. But the powers of initiative and a constant concern with anticipating the scientific needs of the Nation are not in the traditions of this body. In this transitional period at least leadership will have to come from elsewhere.

AMERICAN CHEMICAL SOCIETY,
Washington, D. C., June 9, 1958.

Hon. HUBERT H. HUMPHREY,
United States Senate, Washington, D. C.

DEAR SIR: The present challenge to American science and technology has been a matter of deep concern to members of the American Chemical Society. At its most recent meeting our board of directors formulated and adopted a statement of policy which was received with approval by the council, the popular deliberative assembly of the society. Attached is a copy.

This statement is transmitted because the society is fully aware of your deep and genuine interest in the development of sound legislation for strengthening scientific research and education. The American Chemical Society, a federally chartered organization with more than 84,000 professional members, wishes to be of assistance. For years it has been concerned about problems such as we are now facing and it has initiated positive remedial programs. The society's statement of policy on specialized personnel (1955) and another on matters relating to education (1956) both were received favorably by Congressmen.

The American Chemical Society pledges its cooperation in efforts to implement the recommendations in our policy statement. We hope that you will find them worthy of your thoughtful consideration.

Very truly yours,

ALDEN H. EMERY,
Executive Secretary.

[Reprinted from Chemical and Engineering News]

STATEMENT OF POLICY BY THE BOARD OF DIRECTORS OF THE AMERICAN CHEMICAL SOCIETY ON THE PRESENT CHALLENGE TO AMERICAN SCIENCE AND TECHNOLOGY

Events of the past several months have made the American people aware, as never before, of the importance of science and technology to their continuing welfare and security. This awareness has prompted many proposals for accelerating scientific progress, particularly in the military field, and for strengthening our educational system to assure the training of highly qualified scientists and engineers to meet the Nation's future needs.

These are problems with which the American Chemical Society has been actively concerned for years. In World War II, for example, the society warned the Nation of the unfortunate effects on our scientific and technical manpower of certain selective-service policies, which ultimately were corrected. The society has pointed repeatedly to weaknesses in the educational system, and has suggested remedies. The need for a more favorable climate for the work of scientists and engineers has constantly been stressed.

In the light of recent developments, it seems appropriate at this time for the board of directors of the society to reemphasize many of the views it has expressed previously, and to offer some additional recommendations.

With national defense increasingly dependent upon continuing technological progress, the present situation poses a twofold challenge to the United States: that of maintaining the country's immediate security, and that of doing whatever is necessary to insure its safety 10 to 30 years from now.

The immediate danger is essentially military, and must be met with the men and other resources now available. The long-range danger is far more complex, and can best be met by a comprehensive program to strengthen the American educational system.

In the military area, research and development work is of prime importance. As now organized, these activities are divided among three services—the Army, Navy, and Air Force. Although some research and development work is applicable to only 1 service, many projects are of equal interest to 2 or all 3 services. For this reason, greater centralization of military research seems desirable. To be most effective, such a program should be under a director reporting to the Secretary of Defense and should have adequate financial support.

With respect to nonmilitary research and development activities of the Government, this board believes that a comparable situation exists and that here, too, greater centralization is in order. Those research and development programs of concern to more than one agency could well be combined under a director who would have adequate funds for his operations and who would report to the President. This director would be in a position to advise the top policy councils of the Government on scientific matters.

Research and development work is almost always done on a project basis. The very nature of research—exploration of the unknown—makes exact scheduling difficult, if not impossible. Most projects of significance cannot be finished in a year; many require several years. The system of awarding funds annually, in common use at present, often interferes with efficient operations. Therefore, this board recommends that Congress adopt as a general policy the granting of research funds on a long-range basis to cover those projects which obviously will require more than a year.

The long-range challenge to the United States requires substantial improvement of our educational system to train properly leaders in science, technology, and other vital fields whom the Nation needs in the years ahead. Much more empahsis, therefore, must be placed upon maximum intellectual development as the main goal of education.

This board recognizes the need for the education of all in a democracy, and the consequent need for a variety of courses to meet the requirements and interests of students of differing abilities. The board believes, however, that the time has come to make a clear distinction at every educational level between fundamental courses—such as the sciences, mathematics, languages, and the humanities—which contribute to intellectual growth, and courses which do not. Once this distinction has been established, scholarships, awards, and college entrance requirements should be based largely on accomplishment in fundamental courses. This will encourage superior students to concentrate on fundamentals and will help parents to judge the value of their children's studies.

Important though greater emphasis upon fundamental subjects may be, it will accomplish little if our schools and colleges lack competent teachers of those subjects. There is ample evidence of a teacher shortage which can be attributed largely to low salaries and low prestige. This situation must be corrected.

This board believes that teacher-training practices should be modified in many States. Teacher certification standards should be based primarily on knowledge of subjects to be taught.

Science has moved so rapidly that curriculums, textbooks, reference materials, teaching aids, and tools of communication are often outmoded. Modernization is urgently needed to increase the effectiveness of teachers.

Elementary and secondary edueation in the United States is under local control, and the support of school boards, parents, and taxpayers is necessary for improvements. Many of the 151 local sections and 83,000 individual members of the American Chemical Society have worked in their own communities toward these goals. The board recommends that such efforts be continued and intensified.

It is recommended, also, that efforts to build public understanding of the work of scientists and the meaning and importance of scientific progress be increased. The press, radio, television, and all other available mediums should be used for this purpose.

Basic research is another area in which greatly increased activity is imperative. Broader support is needed for basic research in the United States to assure a proper balance with technology. Basic research seeks new knowledge of the laws of nature, regardless of immediate practical value. Technology applies basic scientific information to the solution of practical problems, including the development of new weapons. Because of intense technological competition among nations, the country which leads in basic researeh is most likely to lead in teehnology.

To sum up, the board of directors of the American Chemical Society offers the following recommendations to meet the present challenge to American science and technology:

(1) Greater centralization of military research, with adequate financial support, under a director reporting to the Secretary of Defense.

(2) Greater centralization of the Government's nonmilitary scientific and technological activities, with adequate financial support, under a director reporting to the President.

(3) Adoption by Congress of a policy whereby research funds could be granted on a long-range basis, so that projects requiring more than 1 year could be planned and executed more efficiently.

(4) Restoration of emphasis in school and college curriculums upon courses contributing to intellectual development through:

(*a*) Evaluation of courses on the basis of the intellectual challenge they offer;

(*b*) Recognition of achievement in the more intellectually challenging courses as the basis for college entrance and for scholarship grants and awards.

(5) Improvement of incentives to attract highly qualified men and women to the teaching profession through:

(*a*) Adequate compensation, with increases based mainly on merit and on subject matter training and experience;

(*b*) Increased prestige, based on greater opportunities for self-improvement and wider public recognition of the contributions of teachers to the national welfare and security.

(6) Investigation and development of more modern curriculums, textbooks, reference materials, teaching aids, and tools of communication to improve the effectiveness of teachers.

(7) Modification of teacher training practices and certification standards in many States to increase emphasis on knowledge of subjects to be taught.

(8) Continued and increased efforts by local sections and individual members of the American Chemical Society to strengthen the school systems of their own communities.

(9) Increased efforts, through all media, to build public understanding of the work of scientists and the meaning and importance of scientific progress.

(10) Broader support of basic research in the United States.

THE UNIVERSITY OF WISCONSIN,
COLLEGE OF AGRICULTURE,
Madison, June 18, 1958.

Senator JOHN L. MCCLELLAN,
United States Senate Office Building,
Washington, D. C.

DEAR SENATOR MCCLELLAN: Thank you for sending me a copy of part I of the hearings before a subcommittee of the Committee on Government Appropriations, United States Senate, 85th Congress, 2d session, on S. 3126: Science and Technology Act of 1958.

I am a trustee of biological abstracts, and wish to record my support of the statement of G. Miles Conrad as presented on pages 237–258 of the record of the hearings.

Sincerely yours,

WILLIAM B. SARLES,
Chairman, Department of Bacteriology.

AMERICAN SOCIETY FOR TESTING MATERIALS,
Philadelphia, Pa., June 16, 1958.

Hon. HUBERT H. HUMPHREY,
Chairman, Subcommittee on Reorganization,
United States Senate, Washington, D. C.

DEAR SENATOR HUMPHREY: Your proposals outlined in the hearings of May 2 to compile information relative to existing facilities engaged in assembling, coordinating, and distributing scientific information pursuant to the Science and Technology Act of 1958 are of interest to our committee work. Reference to the work of the American Society for Testing Materials was made by Mr. James W. Perry in his testimony which was printed on page 59, part I of the hearings of the second session on S. 3126.

Our subcommittee on standard data of ASTM committee E–13 on absorption spectroscopy has been developing a program over a 6-year period to index scientific data relative to the fields of infrared, ultraviolet, and visible absorption spectroscopy. In essence this program has been extracting data published in scientific journals, technical books, or issued by several commercial and Government laboratories, as well as technical societies, to provide working data for scientists. This work has been conducted in cooperation with the technical information staff personnel at Battelle Memorial Institute, National Bureau of Standards, and through the efforts volunteered by scientists in many industrial, Government, and educational institution laboratories.

The work has achieved an international scope since we are indexing technical data issued by the English-German scientists through the European Documentation of Molecular Spectroscopy (DMS). We have recently coordinated our efforts with the French scientists through their "groupement pour l'Avancement des Methodes Spectrographiques" (GAMS).

Our work to coordinate the indexing of data issued in the United States has come from cooperation with such organizations as American Petroleum Institute research project 44 and the National Research Council's Committee on Spectral Absorption Data. The majority of the critical data we have indexed to date indexed to date has been issued by commercial organizations. More recently, the Coblentz Society, which is a technical organization comprised of scientists with interests in these specialized fields of technology, has organized a coordinative and cooperative effort to provide readily accessible information.

The indexing program provides data reduced by a standard coding system and presented on IBM punched cards for rapid machine sorting procedures. The great utility of these index cards has been demonstrated in more than 300 laboratories throughout the world. The project is on a current basis and regularly issues supplements. We are submitting samples of these cards and a copy of our coding system for your records.

However, as has been stressed in your hearings, there is also an urgency and necessity of improving the services to scientific personnel in this specialized field of work. The field of spectrophotometry provides rapid methods of instrumental analysis which now serve many fields of scientific research and development. The basic reference data required in these applications are not being produced at a rate equal to the demands on such methods of analysis. Much effort is being dissipated by duplication and the lack of coordination. We realize our efforts of indexing the critical data on punched cards is only an interim. We look forward to the development of a coordinated program using high speed search equipment to provide our scientists in these specialized fields with the necessary critical data.

We will continue to follow the printed testimony on S. 3126 with great interest. Our committee will welcome the opportunity to cooperate with others in seeking the solutions to the many challenging problems for better and more rapidly disseminated scientific information.

Yours very truly,

M. V. Otis,
Chairman, Subcommittee III on Standard Data, ASTM Committee E-13,
Research Laboratories, Tennessee Eastman Co., Kingsport, Tenn.

Lehigh University,
Bethlehem, Pa., June 23, 1958.

Hon. Hubert H. Humphrey,
Senate Office Building, Washington, D. C.

My Dear Senator Humphrey: I make reference to the published hearings, part 1 on S. 3126, pages 98 and 102–103.

On pages 102 and 103, Mr. Adkinson's letter to Mr. Reynolds calls into question my statement (p. 98) of belief that the National Science Foundation had subsidized the Pergamon Institute's Russian translation program. I am grateful that Mr. Adkinson has gone out of his way on a relatively minor point to disclose the facts. And since he also writes that Pergamon "have worded their statements in such a way that one would be led to believe that there was a direct cooperation between the Foundation and Pergamon Press," I am in no way embarrassed. Unfortunately I did not receive a copy of Mr. Adkinson's letter to Mr. Reynolds; otherwise, I might have documented my statement in time for inclusion in the referenced hearings.

My belief was founded upon an undated publicity release issued by the Pergamon Institute, signed in facsimile by Capt. I. R. Maxwell, who also testified on this bill.

The relevant part of this release appears at page 3, and reads as follows:

"Journals being translated by the Institute and now available in an English edition:

"3. The Institute now publishes a number of selected Russian journals in translation:

Atomnaya Energiya (Atomic Energy)
Problems of Virology [1]
Problems of Hematology and Blood Transfusion [1]
Journal of Microbiology, Epidemiology and Immunobiology [1]
Biophysics [1]
Problems of Oncology [1]
The Sechenov Physiological Journal of the U. S. S. R.[1]
Elektrichestvo (Electricity)
Physics of Metals and Metallography [2]
Abstracts of U. S. S. R. Metallurgy [2]

"[1] On the initiative and with the financial assistance of the National Institutes of Health, United States Department of Health.

"[2] With the financial assistance of the National Science Foundation and the Board of Governors of Acta Metallurgica."

Academic librarians no less than people in industry here in the United States face a complex, important and expensive problem in this matter. The Pergamon Institute is clearly one of the independent agencies which, in our system, can play a significant part. However, it would appear that they have used the name of the National Science Foundation in a misleading way, and that the burden of accuracy in this case rests upon them. In any case, the Foundation apparently supports Pergamon's work indirectly; and is to be congratulated for it.

If you and Mr. Reynolds see fit, I should be obliged if this letter could be inserted in your records. I am, however, much indebted to you already for inviting me to testify on this legislation.

Sincerely yours,

JAMES D. MACK,
Librarian.

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
OFFICE OF THE MAJORITY LEADER,
Washington, D. C., June 23, 1958.

Hon. HUBERT H. HUMPHREY,
United States Senate,
Washington, D. C.

DEAR SENATOR HUMPHREY: I received a call from Mrs. Corinne Friedman of 67 Reservoir Street, Needham Heights, Mass., concerning the hearings recently held by you on foreign translations. I told Mrs. Friedman I knew nothing about this but I would transmit any letter that she may write to you on this subject. I enclose herewith her letter.

With kind regards, I am

Sincerely yours,

Dr. MARTIN SWEIG, *Secretary.*

MORRIS D. FRIEDMAN, INC.,
Needham Heights, Mass., June 21, 1958.

Senator H. H. HUMPHREY,
Senate Office Building,
Washington, D. C.

DEAR SENATOR HUMPHREY: We have been reading the testimony presented at the May 2, 6, 7, 1958, hearings on S. 3126 and have found it to be fascinating and startling, too. The whole question being considered in S. 3126 is so vast and the separate parts are so closely interrelated that it would be extremely difficult to make adequate comments in a letter. We would, therefore, like to inquire into the possibility of making an oral deposition to some member of the committee staff.

We are a firm that provides translations, as well as information-retrieval-type services, to scientists who use them and who would be willing to comment on their value. For 4 years now, we have been "educating" scientists, and the librarians to whom the scientists must turn for bibliographical information, on the various

aspects of Russian technical and scientific literature. For a long while, until the expense became prohibitive, we supplied scientists and librarians with translations of the tables of contents of current Russian scientific journals, without charge. We have made it a point to try to know as much as is possible about what is being translated and who is doing the translating. We have a rather exhaustive card-catalog listing of unclassified, available translations which is undoubtedly better than the one kept by the John Crerar Library of the Special Libraries Association. And better than that, we use this catalog to try to eliminate duplication, on our part, of work already done. Unfortunately, we cannot say the same for other translators, either Government, industrial, or commercial. We can state unequivocaly that we are as conversant with the whole area of Russian translation as any other larger agency in the United States.

Among the things which we would like to discuss in our oral deposition are:

1. The translations program as presently being mishandled by the NSF. Namely, the lack of control or, perhaps, the word "guidance" is better, to see that translations are reasonably current so that they do not lose value, as Captain Maxwell suggested. It is, in fact, too bad that the 14 or so journals being translated by the nonprofit-making arm of Captain Maxwell's Pergamon Press are at least a year or more behind.

2. The misinformation being transmitted by the story about the paper on Boolean algebra and the relay-switching circuit research. As indicated by Mr. Baker of the Bell Telephone Laboratories, this material was known to the people of Bell and the Harvard Computation Laboratory who were interested in it. However, we have information about a more recent case in which earlier, complete knowledge of current Russian research would have saved some time and money.

3. The value of translations to the scientists who use them, with particular reference to MIT scientists who have ordered our translations.

4. The need for better exchange arrangements between ourselves and the rest of the scientific world, as indicated by our experience in assisting the MIT libraries to set up such an arrangement whereby this country now has scientific information not available to it previously.

In conclusion, we would like to assert that we do not look forward to having the Government enter the translation and information-retrieval program any further.

Yours very truly,

CORINNE FRIEDMAN.
(Mrs. M. D.)

WESTERN RESERVE UNIVERSITY,
Cleveland, Ohio, June 30, 1958.

Mr. WALTER REYNOLDS,
Staff Director, Committee on Government Operations,
Senate Office Building, Washington, D. C.

DEAR MR. REYNOLDS: In accordance with our continuing discussions, I am pleased to forward a copy of the material we are sending to the Council on Documentation Research, reporting on the actions of the National Academy of Sciences and on the cooperative activity we are now initiating in order to aid NAS–NRC program.

Please feel free to use this material in any way that you may see fit.

With best regards.

Sincerely,

JESSE H. SHERA,
Executive Secretary, Council on Documentation Research.

SUMMARY OF MEETING OF THE EXECUTIVE COMMITTEE OF THE COUNCIL ON DOCUMENTATION RESEARCH, JUNE 2, 1958, LEHIGH UNIVERSITY

Present: James D. Mack, Robert Taylor (Lehigh University); Clem O. Miller (National Academy of Sciences); S. Newman (U. S. Patent Office); Don C. Hilty (Electro Metallurgical Corp.); Herman H. Henkle (John Crerar Library); Jesse H. Shera, Allen Kent, J. W. Perry (Western Reserve University); Frank T. Sisco (Engineering Foundation).

Meeting was opened by Jesse H. Shera at 9:45 a. m.

The executive committee meeting consisted almost entirely of a discussion of the program planned by the National Academy of Sciences, National Research Council and the role which the Council on Documentation Research may play in the fulfillment of the program.

The points outlined in Dr. Bronk's letter of May 14, 1958, which follows, were discussed in order and at some length.

NATIONAL ACADEMY OF SCIENCES,
NATIONAL RESEARCH COUNCIL,
Washington, D. C., May 14, 1958.

Dean JESSE H. SHERA,
School of Library Science,
Western Reserve University, Cleveland, Ohio.

DEAR DR. SHERA: In response to your letter of May 12, I am glad to advise you that on April 27, 1958, the Governing Board of the Academy-Research Council approved recommendations that emerged from discussions at the National Research Council meeting on March 31 and April 1, of the request addressed to us by the Council on Documentation Research.

Under these recommendations we expect to establish an Advisory Board on Information and Documentation in Science with members of high competence, including both scientists and information specialists, to prepare a plan for effective action on the problem. This Board would have a small full-time professional staff to assist it in carrying out its study. The functions of the Board would include the following:

1. To scrutinize the national and international problems in this field on a general policy level.
2. To make a survey and assessment of the knowledge now available and of the work in progress.
3. To prepare a plan for the coordination, by appropriate agencies, of the many activities now being carried on in this field under the auspices of the Academy-Research Council and elsewhere in the country.
4. To address itself to certain concrete and immediate problems, including assistance to the Office of Scientific Information of the National Science Foundation, the assessment of proposals for research undertakings, the identification of areas where new knowledge is needed, etc.
5. To effect liaison in its study among the several committees and groups now studying the problem, including the Committee on Information in the office of Dr. James R. Killian, assistant to the president for Science and Technology, the Federation of Abstracting and Indexing Services, etc.
6. To prepare a plan for an information center on the subject of information and documentation in science.

We plan to proceed along these lines in the near future, and we shall be very glad to have the assistance and advice of the Council on Documentation Research.

Sincerely yours,

DETLEV W. BRONK, *President.*

The proposal of the Council on Documentation Research was discussed by a workshop group during the annual meeting of the National Research Council on March 30, 31 and April 1. The recommendations outlined in Dr. Bronk's letter resulted from the recognition by this group of the very real need for some such program as the Council proposed and the appropriateness of the Academy's taking action to bring some sort of order out of all the chaos in scientific documentation.

Dr. Miller explained that the NRC policy has always been to integrate, not splinter, and that appointees to the projected Advisory Board (who will probably serve 3-year terms) will be sought among the Nation's leading scientists and documentalists. The usual Academy procedure for a project of this type is for Dr. Bronk to name members to a planning or organizing committee for the new project. This committee will select members of the committee or board which will act as advisor to the project. It was decided that the Council on Documentation Research should draw up a list of qualified persons who might well be considered by this "nominating committee." It was also decided that all who attended the February 3, 4 meeting should be invited to submit a similar list. Dr. Miller indicated that suggestions for the directorship would also be welcome.

Dollars-and-cents figures cited by Don Hilty served to emphasize the vital stake of research mangement in an effective solution to the information-retrieval problem, and it was agreed that appropriate representation from industry on the Board will be most essential.

SUMMARY OF DISCUSSION OF SIX POINTS IN DR. BRONK'S PROGRAM

Point 1. To scrutinize the national and international problems in this field on a general policy level.

This operation would include the identification and evaluation of areas of overlap between disciplines; making decisions regarding the order of priority

for distribution of research efforts; surveying of duplication within disciplines, including the economic aspects thereof, in order to determine how much money now wasted could profitably be directed toward the efficient operation of a centralized service. It was agreed that a "crash" program would not be practicable in this area at the moment.

Point 2. To make a survey and assessment of the knowledge now available and of the work in progress.

The main objectives should be discernment of the broad pattern of activities; much time and effort (and money) could easily be wasted in study and analysis of long lists of projects in process, which are already available or could be drawn up using existing lists as a starting point.

The Council could be of significant assistance in this area by outlining suggestions for study programs and recommending standards for judgment. Dean Shera pointed out, too, that American Documentation could also serve a very useful purpose, not only by publishing a questionnaire designed to elicit the types of information desired, but also by disseminating the results of the questionnaire.

Point 3. To prepare a plan for the coordination, by appropriate agencies, of the many activities now being carried on in this field under the auspices of the Academy-Research Council and elsewhere in the country.

The economic aspect of this activity was stressed particularly—studying and demonstrating the practical results to be derived from the investment of capital in a coordinating agency designed to ensure the most efficient availability of research results. It was felt that the Council's main contribution in this area was perhaps made with its drafting of the preliminary plan for the national science information center which stimulated the Academy's action.

Point 4. To address itself to certain concrete and immediate problems, including assistance to the Office of Scientific Information of the National Science Foundation, the assessment of proposals for research undertakings, the identification of areas where new knowledge is needed, etc.

It was the consensus of opinion that the Washington representatives on the new Board could be relied upon for long-range planning and studies; but that the Council could well undertake to insure that, once the survey of projects in process is completed, practical short-range programs will also be identified and undertaken.

Point 5. To effect liaison in its study among the several committees and groups now studying the problem including the Committee on Information in the office of Dr. James R. Killian, Assistant to the President for Science and Technology, the Federation of Abstracting and Indexing Services, etc.

The group expressed only the pious hope that the "etc." was intended to include UNESCO, ASLIB, ARL, as well as the Council on Documentation Research.

Point 6. To prepare a plan for an information center on the subject of information and documentation in science.

The contribution of the Council in this regard is covered under point 2.

Six immediate responsibilities for the Council were outlined at this meeting:

1. Draw up a list of names of candidates for the directorship of the new Board.
2. Draw up a list of names of candidates to work with the Director as members of the Board.
3. Assemble as detailed a list as possible of projects now in process in the information-handling field, with estimated time of completion, stated objectives, etc.
4. Express appreciation of the Academy's willingness to accept a position of leadership in this field, and offer whatever assistance the Council may be able to provide.
5. Arrange, in cooperation with the Academy, for a meeting between Dr. Cornell and Council representatives for the continuing of close cooperation.
6. Provide to all attendees at the February 3–4 meeting a summary of action which has been taken since that time, together with this summary of this executive committee meeting.

The meeting closed with a summation of the May 2, 6, and 7 hearings before Senator Humphrey's Subcommittee of the Committee on Government Operations, at which several members of the Council executive committee were asked to testify.

OTHER ACTIONS

1. American Standards Association requested representatives from the Council on Documentation Research; Jim Mack designated and agreed to serve.
2. Letter from Foster Mohrhardt to Jim Mack indicates that the Association of Research Libraries wishes to become more active in documentation and

automation of library activities; Herman Henkle urged ARL to be more active at their midwinter meeting. Committee being appointed.

3. Engineering Societies Library now a member of Council.

MEETING OF EXECUTIVE COMMITTEE OF COUNCIL ON DOCUMENTATION RESEARCH, LEHIGH UNIVERSITY, JUNE 2, 1958

Meeting was opened by Jesse H. Shera at 9:45 a. m.

JUNE 3, 1958.

D. D. ANDREWS.
S. M. NEWMAN.

INFORMAL REPORT ON MEETING OF THE EXECUTIVE COMMITTEE OF THE COUNCIL ON DOCUMENTATION RESEARCH HELD AT LEHIGH UNIVERSITY, JUNE 2, 1958

Dr. Perry has a list of those present. Some small business matters were first reported upon. The Engineering Library has accepted membership in the council. The request of the American Standards group that we participate in their organization was assigned to Mr. Mack who accepted the nomination as our representative. Foster Mohrhardt has prepared a report urging the ARL to get on the band wagon and the ARL is appointing a committee.

The main business of the meeting was a consideration of Dr. Bronk's letter to Dr. Shera. Dr. Clem O. Miller was present and represented Dr. Bronk and the AAS–NRC. Dr. Miller reported on the annual NRC meeting where one of the workshops was directed to information handling. Dr. Rossini and Dr. Charles Campbell ably presented the problem at this workshop. The annual meeting noted the need for the action requested by the Council on Documentation and also noted it was appropriate for the NRC to make such a study. A Board will be set up by NRC. The Board itself will be large enough to represent diverse scientific disciplines. It will have a chairman and it will have an executive secretary and staff, none of which have been picked yet. The AAAS will probably be represented on the Board either by Dale Wolfle or someone suggested by him. Dr. Bronk is going to Russia soon on the intercultural exchange program but this does not necessarily mean that no action will be taken on the Council on Documentation's request. Dr. Miller made it clear that suggestions from all sources, including the council's will be accepted and that the new Board will feel free, he was sure, to call for help from all parties and that the council would undoubtedly be one of the parties called upon. He also stated very definitely that the NRC would not be interested, and is not interested, in a crash program.

Dean Shera indicated that there were three actions which the group might take:

1. State that the job is done, fold their tents and go home;
2. Present a specific plan of action to NRC; or
3. Sit quietly by and watch and wait.

Substantially the rest of the meeting considered action by the council. Dr. Miller indicated that he thought NRC would be interested in a list of people for any or all of the jobs to be filled. A member of the executive committee indicated that Dr. Campbell had already been suggested as executive secretary or, if he could not be spared, he be at least made a member of the Board.

The question arose as to whether the full council should make suggestions as to personnel for NRC. Dr. Miller cautioned that if this were done, it be done tactfully and quietly and not be a broadside which might embarrass NRC.

If Dr. Bronk proceeds in the normal manner, he will probably select a chairman and a planning committee of 3 or 4 of the stature, for example, of Dr. Warren Weaver, who will go over any list and of their own information select individuals who could contribute to the work of the new Board. Dr. Perry suggested one group which should be represented on this Board, namely, the Industrial Research Management group since indications had shown that they, more than the librarians or the users thereof, were aware of information retrieval problems and the costs of poor information retrieval. Don Hilty of Electro-Metallurgy, Union Carbide, indicated that he had some figures which he would give the group but which were not to be generally released and he was not to be officially quoted. These figures are on combined information retrieval and evaluation and are on a person-year basis:

For technical nonexperimental personnel	$23,000
For personnel involved in fundamental research	50,000
For those in applied engineering	70,000

Note these figures are per man-year. He also indicated that over a period somewhat short of a year, some $90,000 spent in information retrieval and evaluation saved approximately $4 million on $30 million of sales.

Kent suggested that the medical profession had done very well in research when they had the opportunity to study the internal goings on of the man with the glass panel in his stomach and pointed out that in the information retrieval field, we have a man with a glass stomach; namely, the United States Patent Office, and he suggested to Dr. Miller that this be taken into consideration by NRC.

Dean Shera suggested that it would be to the mutual advantage of both the council and NRC to meet, discuss, and hear about problems in documentation.

At this point, it was decided to consider the 6 points in Dr. Bronk's letter. Considering first point 1 which reads:

"1. To scrutinize the national and international problems in this field on a general policy level."

The consensus was that this basically stated the problem of what should be done, where is the emphasis to be put, how much international cooperation, if any, should be done, and emphasized again that NRC was interested in fundamental action and not in a crash program. No statement of the problem in any detail has ever been made.

Point 2 was next taken up:

"2. To make a survey and assessment of the knowledge now available and of the work in progress."

This clearly lines up a job for the new staff of the NRC Board. Undoubtedly the council could be of help particularly in collecting data on work in progress, who is doing what, gather information. After some discussion, it was decided that Mr. Andrews should set up a committee to draft a questionnaire to be sent out to groups working in information retrieval which, when completed by them, would be informative to both the council and NRC.

Point 3 was next discussed:

"3. To prepare a plan for the coordination, by appropriate agencies, of the many activities now being carried on in this field under the auspices of the Academy-Research Council and elsewhere in the country."

This states fundamentally what must be done. Don Hilty indicated that this was essentially a question of economies, of conservation of manpower and of getting the most for the money now being spent by others.

"4. To address itself to certain concrete and immediate problems, including assistance to the Office of Scientific Information of the National Science Foundation, the assessment of proposals for research undertakings, the identification of areas where new knowledge is needed, etc."

The group felt that the long-range problems should not be neglected and that some planning is necessary to know what research undertakings are to be done and to identify areas where new knowledge will later be needed as a tool in the research presently being undertaken or planned.

In point 5,

"5. To effect liaison in its study among the several committees and groups now studying the problem, including the Committee on Information in the Office of Dr. James R. Killian, Assistant to the President for Science and Technology, the Federation of Abstracting and Indexing Services, etc."

The only suggestion that the committee could offer was that "etc." could include at least the ARL.

While point 6, "to prepare a plan for an information center on the subject of information and documentation in science" was being discussed, I unfortunately was called out of the meeting on an official phone call and have no notes on this point.

The council then staked out its job at this time. It will get out the questionnaire, it will attempt to discover and then list proper personnel for the Board, executive director and staff for NRC. At this point Dr. Perry questioned whether some basic mathematical model might be created which would be both an approach for study and be used as a standard for judgment for the projects being considered. As I recall, this suggestion was not acted upon. Dr. Miller suggested that within the next few weeks he would try to arrange an informal meeting between Don Andrews, Dr. Cornell, and himself for a very informal exchange of ideas.

Dean Shera suggested that Don Andrews send a letter to Dr. Bronk expressing satisfaction of this group in getting something started and offer cooperation from the council to Dr. Bronk and the newly organized group. Dean Shera thought that in view of Don's absence, he would draft a letter and send it to Don as a

suggestion. Dean Shera also pointed out that at this time a letter to the council members reporting on what had been done since the last full meeting of the council was in order and that he would draft such a letter for Mr. Andrews' signature.

WESTERN RESERVE UNIVERSITY,
Cleveland Ohio, July 1, 1958.

Mr. WALTER L. REYNOLDS,
Committee on Government Operations,
Senate Office Building, Washington, D. C.

DEAR MR. REYNOLDS: I believe that I mentioned to you a speech that I presented in Chicago before the Special Libraries Association in which I urged the library profession to make their views known with regard to the problems that are under consideration by the Subcommittee on Reorganization. I am enclosing for your records and possible interest the text of this speech. You may feel free to do with it as you like and quote any parts of it that may be appropriate or uesful to you.

With best regards.

Sincerely,

ALLEN KENT, *Associate Director.*

For presentation before Special Libraries Association, June 12, 1958, Chicago, Ill.:

DOCUMENTATION IN BUSINESS

By Allen Kent, associate director

* * * * * * *

First I will provide you with data flowing from three sources: (1) The proceedings of a conference held at Western Reserve University earlier this year; (2) a report on eight surveys of documentation problems submitted to the National Science Foundation; and (3) hearings on documentation problems held last month before a Senate Subcommittee.

On February 3, 4, 1958, a special invitational meeting of the Council on Documentation Research was held at Cleveland, Ohio, under the auspices of Western Reserve University. The purpose of this meeting was to consider problems encountered in the exploitation of the world's scientific and technical information. The invitational meeting was attended by representatives of 134 leading professional societies, Government agencies, foundations, industrial organizations, and others concerned with the problems of effective use of scientific and technical information.

Let me pass on to you the comments of several of our business and industrial folk with regard to the problems of documentation in business:

1. L. H. Flett, director, new products division (retired), National Aniline Co.:

"The lack of adequate information results in costly repetition. It delays or stops progress, and particularly in industry, it may lead to costly development of products already patented or in the process of being patented. The cumulative effect of inadequate information is to reduce the efficiency of research. It is difficult to define the losses in exact amounts because exact definition of the areas involved is not possible. With respect to research, a rough estimate is possible. The efficiency of research in the chemical field is generally regarded as 5 to 15 percent. That figure has been published without any serious contradiction. Take the more generous figure of 15 percent for calculation. Many years' contact with research men and their directors makes a rough breakdown of the remaining 85 percent possible:

	Percent
Less by repetition of research (That could be out by a figure of 5 percent.)	10
Less by work that could have been avoided by adequate information (That could be in error by not over 10 percent.)	35
Imperfect definition or understanding of objectives (If anything, that's already on the low side.)	40"

2. D. C. Hilty, manager, research information, Electro Metallurgical Co.

"The problem of doing anything about information, even in the specific field of one industry, is exceedingly large. Now, many industrial organizations are not satisfied with what they have; the very fact that some of them have gone about trying to set up their own information retrieval systems for a limited

segment of the field indicates that they're not satisfied, that they need something better and they're willing to put money into developing something better."

3. Merritt Kastens, Stanford Research Institute:

"* * * In many instances it now costs more to do the literature search than it does to do the experimental work, and the scientist as I see him every day is increasingly throwing up his hands in despair and saying, 'There is no point in doing the literature research because the odds are too bad and it takes too long. I may as well go and do it over again, 'cause it's cheaper that way.' Unfortunately, the scientist is often right when he says that. Perhaps some of you saw the testimony recently in Washington where one Government research executive said that on any project that is budgeted for less than a hundred thousand dollars, it does not pay to do a literature search. This is just a matter of odds, of gambling odds. The chance of finding anything through the library research is often not great enough to warrant the cost of doing it; it's cheaper to go into the laboratory for primary data. In a tragic percentage of instances—the cost of literature research is greater than the cost of the laboratory research because the literature organization is so clumsy and so inadequate. Ultimately, it is this cost problem we're faced with, because the information cost curve is a steadily ascending one.

"As Mr. Hilty said this afternoon, the cost of experimental research is going up; but the cost of literature search is going up faster, and in one field after another the cost of doing literature research has crossed the cost line of doing experimental research. This is the simple economic fact that we must meet in this sort of a group. The present inadequate information system is costly in time, it is costly in manpower, it's costly in money, and the problem is before us. Those of us, like myself, who are not information specialists and are not library people or abstractors or indexers, but frankly, we who are in management and who have to fight these budgets all the time; we can see it, we can see it very clearly, and it scares us. It hurts in the pocketbook. So if there's anything I would emphasize it's merely this: Let not this group fall into the fallacy of what's been called frecently 'complacent conceit.' The problem is real, and it's directly before us. It's costly, and it will be costly and more costly until we take some general steps and some very profound steps to look at the problem in its entirety and take that first step toward solving it in its entirety."

The second source of information that I wish to provide to you is a report that I submitted to the National Science Foundation and that has just been published in book form—on Centralized Information Services (Interscience).

The report was prepared under a grant from the National Science Foundation whose basic purpose was to systematize and to analyze the results of 8 studies and surveys which I carried out during the past 3 years in fields which would be expected to throw light on the feasibility and need for centralized and cooperative information services.

These surveys involved:

1. Metallurgical organizations.
2. Chemical organizations.
3. Ordnance establishments.
4. Two surveys of several thousand United States organizations.
5. Defense establishments.
6. Professional societies, etc.

The results of the surveys indicate that there are a variety of forces working toward full centralization, toward limited centralization, and toward decentralization of documentation activities directed to the processing for more effective use of recorded scientific and technical knowledge in general, and published periodical and report literature in particular.

It was noted that there is a strong and insistent expression of need for additional information processing activities. The need for additional information processing activities. The need for additional services has manifested itself in two ways:

(1) By the commitment of considerable funds and manpower to process the desired recorded information by individual companies beyond that processing that is provided by an existing centralized service.

(2) By resultant pressure for more centralization in information processing.

The results of one of these major surveys were written up—with conclusions—and distributed to a large sampling of United States companies. The number of organizations responding was gratifying—with some of the statements being as follows:

From petroleum company:

"* * * information specialists must experiment widely and constantly, at great cost, to provide adequate services where complete abstracting and indexing is not possible within the company technical information section."

From petroleum company:

"* * * My only comment is that it appears that we in the United States are not receiving the best possible return for our technical information dollar; there seems to be much needless duplication of effort."

From pharmaceutical company:

"* * * For other than the current material a centralized abstracting service would indeed be a great boon to those of us who scan several services."

From electrical manufacturing company:

"* * * The needs of industry, generally, are so diversified that unless some systematized method is evolved, everyone will waste far more time in poring through information, which is either unnecessary or not of interest, than we do presently in going over the data from our existing sources of information."

The third source of information that I wish to provide to you is a summary of hearings on the subject of documentation problems held before a Senate subcommittee on May 2, 6, and 7. Here, the subcommittee was interested in testimony on what the Federal Government should be doing in the documentation field.

All those who testified and who represented industrial or business interests pointed to the inadequacies of present methods for exploiting recorded information. Also they pointed to the need for coordination of documentation activities and Federal support of new and improved literature exploitation activities.

Also there appeared to be an impression that existing Government agencies now having responsibilities in this area had not discharged their responsibilities courageously or imaginatively.

DISCUSSION

I have brought these three events to your attention in the way that I did to point out an anomaly that many of us have noted—particularly at the Senate hearings and at the meeting at Western Reserve University—the anomaly of users of recorded information pointing to aid that many of them require in exploiting the vast amount of recorded information available to them and of potential importance to the industrial decisionmaker.

On the other hand, we have the situation in which many of those responsible for preparing secondary publications assume the stand that they are doing a good job—and that their responsibilities end when they have placed in the hands of the potential user the traditional tools—abstracts and indexes.

It was a curious experience to see these two groups talking past each other.

The extent of the documentation problem confronting the industrial user came to light in one of the surveys discussed in the report to the National Science Foundation. The purpose of the survey was to investigate trends in scientific indexing and abstracting services in the United States. A questionnaire was directed to 2,000 special librarians listed in the directory of the Special Libraries Association.

Questions were directed to—

(*a*) Determining whether abstracts of published papers are prepared internally on a regular basis.

(*b*) Determining the fields of science and technology in which internal abstracting is conducted.

(*c*) Determining costs of internal information processing activities.

(*d*) Determining desire for and type of auxiliary services on centralized basis from professional societies.

It was found, first of all, from the 604 questionnaires returned, that 37 percent of the companies replying prepare abstracts of published papers on a regular basis for the benefit of employees.

It was found that the companies engaging in abstracting and indexing the published literature incurred annual expenses as follows:

	Percent
More than $5,000	40
More than $10,000	28
More than $15,000	20
More than $35,000	7
More than $50,000	4

It was noted that the median 1956 expenditure for professional societies in processing the published literature in their field for the benefit of their members was exceeded by almost 20 percent of the individual user companies that processed published literature for use by employees.

In the face of these costs, it was found that 50 pereent of the eompanies replying indieated that their internal literature processing expenses could be redueed and the effectiveness of exploitation of the published literature enhanced by auxiliary services from various centralized sources.

As an aside, it was found that the user companies averaged about 10 abstracting and indexing services to which they subscribed. In this survey, 312 different abstraeting and indexing serviees were identified—a commentary on the fragmentation of secondary information processing services that have sprung up in a frantic and uncoordinated effort to control the burgeoning literature.

Although there is not time to summarize for you the results of eaeh of the surveys reported in the NSF study, one all-important conclusion is inescapable, namely, that these persons making use of the literature in depth are most aware of limitations of presently available services. Much additional evidence for this conclusion could be presented. In particular, in eertain organizations both the librarian indicated substantial expenditures for processing of published literature for internal use, and also top management indicated that a substantial percentage of the research time of scientists and engineers (over 6 percent) was spent on the use of recorded information. These organizations expressed the greatest desire for increased auxiliary information exploitation aid from centralized sources.

Just before eompleting this paper and sending it off to the program ehairman, I received my copy of the June issue of Fortune and read the artiele, The Mystery of Wage Costs (pp. 202 ff.).

The article pointed out that a clue to the inflationary rise in costs and prices that has so mystified economists in recent years may be found in the rapid rise of the nonproduction worker.

It was pointed out that in the 10 years from 1947–57, the number of nonproduction workers in manufacturing inereased 60 percent, while the blue-eollar force remained almost stationary. This group, which receives salaries, as against the blue-collar group, which receives a piecework or hourly wage (show slides) has become an increasingly important component of manufacturing labor costs.

It was further pointed out that the rise in nonproduction workers' eosts is the result largely of an extraordinary upsurge in research and development.

With such straws in the wind, I am sure that you will agree that the efficiency with which research is being conducted is in for a good hard look by United States business.

With the increasing realization that as much as half of the efficiency of researeh may be dependent on the effieient use of recorded information, the term "doeumentation" will be heard more and more around the board rooms of this eountry. There will be a rapid progression from talk in board rooms, to good hard looks by the eomptroller, to interviews with the special librarians. The more imaginative operations will be in for expansion. I predict the others will have to prove their value to hang on.

CONCLUSION

I have presented as aspect of documentation in business that has been achieving inereasing attention recently. To put it in proper perspeetive in eonnection with present-day business problems, permit me to point out how, during the past decade, a series of scientific and engineering developments have resulted in extraordinarily rapid advances in eleetrieal teehnology for control purposes and for performing operations which formerly had required mental effort.

These new developments have been spurred by the increasing awareness of the importance of information proeessing as a prerequsite to controlling operations and to making decisions. With the quickening paee of industrial activities, control operations and decisions have come to require greater speed and also to involve broader ranges of complex information. There has been an increasingly rapid trend to apply automatie electronic equipment to supplement and to extend the limited capabilities of the human brain. Any mental task which ean be wholly or partially defined in terms of routine operations can be performed, to that extent at least, by appropriately designed electronic equipment.

The new advances in electronic technology have been applied with outstanding success to the high-speed performance of mathematical eomputations and to the related processing of numerical data, particularly in eonnection with business records. However, the processing of nonnumerical information by suitably designed electronic equipment has remained a field that is only beginning to attraet widespread attention and effort.

The importance of the field of automation of nonnumerical information becomes clearer when we consider the drastie reduetion in the time scale of information gathering for decisionmaking and control during the past 40 years. This change

corresponds to increases in the rates with which competitive activity, international aggressive action, and changes in public opinion can deteriorate economic, military, and political situations. The speed with which information is gathered has shown especially startling changes since feedback techniques were introduced into industrial processing after World War II.

In the processing and mechanical industries, important opportunities for progress are to be found in reducing the amount of human effort required to control the flow of raw materials and intermediate production items during production and the distribution of the end products. The rapidity of control of automatic devices in response to feedback impulses may be of decisive importance in this connection. Early detection of malfunctions and prompt corrective action are particularly important in forestalling catastrophic deterioration of physical equipment.

When actions, processes, and operations are determined less by physical factors and more by mental or intellectual decisions, it has been traditional to assume that the possibility of achieving automatic control decreases and that human operators, technical staff, and management personnel must discharge the control function. Increasingly, however, automatic devices have been developed to take over one task after another. The use of electronic equipment to perform computations is a recent particularly important stage in this continuing evolution.

With present-day computers, it is possible to process and to utilize amounts of numerical data which would have overwhelmed and frustrated manual methods of data processing. The quill-pen accounting methods of an earlier era could not hope to process business statistics in the volume and at the speed required by modern industry. If a serious attempt were made to use such antiquated methods, the only hope of partial success would be to reject a major part of available numerical data and resort to guess work insofar as such rejection resulted in the obscuring of situation. No person worthy of responsibility would attempt to justify such a course of action with regard to business statistics or similar numerical information.

In view of this situation, it is surprising to observe that human inability to perform various library-type operations by means of older methods has been confused with a lack of need for access to information of nonnumerical character. It is no exaggeration to say that much information has been classified as being of "no interest" simply because it was difficult to locate or to correlate. Thus, expansion in the volume of recorded knowledge may, paradoxically, come to connote a decrease in its value. A powerful corrective effect is exerted by the demands of competition both industrial and international. The importance of making efficient use of available knowledge is becoming better understood as efficiency in research, in product development, and in marketing are more clearly evaluated in terms of effectiveness of information services as a basis for improving the quality of decisions. Commercial intelligence operations constitute a particularly striking example of the use of large amounts of fragmentary information from widely divergent sources to achieve insight into otherwise obscure or uncertain situations. Equally important—though perhaps less spectacular—is the use of recorded knowledge in defining research projects, in planning experimental programs, in evaluating their results, in carrying through product development and in marketing new products.

Important decisions are in the making in the documentation field which will influence the jobs that each of us is performing: Senate hearings in this field indicate the growing importance of documentation in our present-day world. Since each of us will be influenced in some way by the hearings in progress, let me suggest that the best way to be assured of optimum decisions is to take part in these deliberations.

THE SATURDAY REVIEW,
New York, N. Y., July 16, 1958.

MR. WALTER L. REYNOLDS,
Chief Clerk, Committee on Government Operations,
United States Senate, Washington, D. C.

DEAR MR. REYNOLDS: From the delay in responding to your memorandum of June 25 you might reasonably suppose that I am not very much interested in what the memo said. But the truth is quite the contrary. I am, in fact, rather pleased to note that Dr. Dupree repeats some of the suggestions I made to you many months ago. My remembrance is that when I suggested the firm establishment of Dr. Killian's office in law, you felt that such a procedure would create a conflict between the executive and legislative branches of government. I have never agreed with you about this and I gather, from your circulation of Dupree's suggestions to the same end, that you've changed your mind. I certainly hope so because I don't think anything so important as this should be left to the chance interest of respective Presidents.

I'm counting on you to continue to keep me informed about the various moves toward better science administration in government, and I hope that on my next visit to Washington we'll be able to sit down together and talk.

Sincerely,

JOHN LEAR, *Science Editor.*

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
PUBLIC HEALTH SERVICE,
Bethesda, Md., June 27, 1958.

Hon. ALEXANDER WILEY,
United States Senate,
Washington, D. C.

DEAR SENATOR WILEY: I was pleased to read the extension of your remarks on the use of electronic computers in research in the appendix of the Congressional Record for June 9 and 14, 1958. We appreciate your reference to the part the National Institutes of Health should play in this development. These remarks, together with the observations you made on the floor of the Senate on May 26, 1958, reflect a perceptive comprehension of what undoubtedly is an instrumental development of great promise in the furtherance of man's inquiry into the nature of human disease and basic life processes.

I am submitting with this letter a statement covering the background, present status, and future possibilities in the use of electronic data processing and computing facilities here at NIH in the field of biological and medical research generally. I hope this material will supply the information sought in your letter of May 27, 1958.

If there is any further way that we can be of assistance to you in this matter, we should be pleased to do so.

Sincerely yours,

JAMES A. SHANNON,
Director.

DEVELOPMENT OF ELECTRONIC DATA PROCESSING AND COMPUTING FACILITIES AT THE NATIONAL INSTITUTES OF HEALTH WITH OBSERVATIONS ON THEIR USE GENERALLY IN BIOLOGICAL AND MEDICAL RESEARCH, JUNE 1958

BACKGROUND

Developments in the field of electronic computing and data processing equipment have been a matter of great interest to the National Institutes of Health over a considerable period of time. For several years, the NIH has been using standard punch card accounting and tabulating equipment in connection with a variety of data processing and computational problems arising from laboratory research, statistical, and epidemiological studies, and administrative operations, such as payroll, property accounting, and inventory control. The growing demand for additional tabulating and data processing services has been one factor in directing attention toward more rapid and efficient methods of processing information.

Simultaneously and perhaps of greater force has been the growing interest and awareness of many research investigators in the potentialities of electronic computers in the study of biological and medical research problems. This, in large part, has its origins in the great changes which have been taking place in biological and medical research in recent years. These changes have involved the increasing use of mathematical, biochemical, and biophysical theories, knowledge, and techniques in the study of biological phenomena. The growing emphasis on quantitative methods has directed the attention of medical research investigators toward more efficient means for the reduction of data and for the solution of the complex mathematical and statistical computations necessary to derive meaning from research data.

It is important to view this development with these basic considerations in mind: Logic is an essential ingredient of the scientific method, mathematics a branch of logic, and computing a branch of math. The extent to which formal logic, mathematical analysis, and computation are employed in a given field depends markedly upon the nature and state of maturity in that field. Fields of science mature at different rates. Biology and medicine have of necessity had a lengthy empirical and descriptive phase. But it is true today that in many areas of these sciences there has begun a phase in which rational analysis and quantita-

tive inference is of the utmost importance. Frequently observations and experiments are separated from conclusions by a long chain of deduction. The deductive process may range from commonsense through formal logic to numerical computation and in complex problems this computation is vast, due either to the complicated nature of relevant theory and equations or to the large number of factors involved or both. While the mere fact of availability of electronic equipment to streamline operations which might be performed otherwise is important, of much greater importance is the fact that at present, and increasingly in the future, biology and medicine make inherent theoretical demands which require modern mathematics, computing methods and equipment.

ANALOG AND DIGITAL COMPUTERS

There are two broad categories of electronic computing equipment currently available for the processing of research data:

1. Digital computers employing discrete electronic impulses in varying combinations, to represent numerical or alphabetical information.
2. Analog computers employing smoothly varying levels of electromotive force to provide an analogous representative of quantitative magnitudes.

A homely example of a digital computer (though mechanical and not electronic in nature) is the ordinary desk calculating machine. A corresponding example of an analog computer is the slide rule.

Each of these types of equipment is designed to meet a different need. The digital computer is superior in speed of operation, in its capacity to manipulate vast quantities of information in a complex manner, in the variety of forms of data input and output, and in memory capacity. The more complicated, and hence more versatile digital computers, however, comprise several large-scale pieces of equipment requiring special housing. The preparation of data for processing and the provision of appropriate machine instructions, called programing, is both prolonged and complex, requiring specially trained staffs.

Analog computers while not suited to the complex processing of large masses of information, can perform mathematical operations with facility and lend themselves readily to simulation of biological mechanisms. The input to analog computers is simple. Operations can be manually controlled and modified, and results can be presented directly through meters, oscilloscopes or curve tracers. These characteristics of analog computers in combination with relatively small size make them particularly useful in the laboratory as a bench-side piece of equipment. There is a place for both types of computers in carrying out medical research. The principal problems of development, however, appear to surround the effective employment of the larger electronic digital computers.

SPECIFIC DEVELOPMENTS AT THE NATIONAL INSTITUTES OF HEALTH

As a result of the developing interest in and need for greater data processing facilities, many NIH investigators sought assistance from research organizations with experience, skill and access to large-scale electronic equipment. Close relationships were developed with the National Bureau of Standards and the David Taylor Model Basin of the Navy.

Early in 1956, problems of data processing and the expanding needs of research personnel presented clear evidence that a more formal and purposeful approach to the development of data processing facilities for handling both administrative and research data should be developed at NIH. In May of 1956, the Director appointed a committee on electronic data processing and computing equipment composed of representatives from the several Institute research programs to study in detail the NIH needs in this area. The committee reviewed the possible areas for application of such equipment at NIH, and other facilities available for data processing. The advantages and disadvantages of existing equipment were considered and the alternative possibilities for answering NIH needs reviewed and evaluated. As a result of over 6 months of study, this committee made a series of recommendations, the major portion of which have already been set in motion:

1. A medium size electronic digital computer (IBM 650) has been installed.
2. A technical staff has been appointed and trained in programing.
3. An Office of Mathematical Research has been created to explore and develop the conceptual and analytical potentialities of modern mathematical approaches to the study of biological systems. A major venture of this development will be the establishment of a mathematics panel for the purpose of bringing together a group of resourceful mathematicians in a considered attack upon theoretical problems in biology and medicine.

In addition to these specific developments, the NIH has undertaken to sponsor lectures and seminars on problems and developments in the application of computers to medical research.

USE OF COMPUTERS IN BIOLOGY AND MEDICINE

The electronic computer at the National Institutes of Health was installed in March 1958. It is not possible in the short period of time that has elapsed to provide any definitive appraisal of the potentialities of such facilities in medical and biological research. Experience so far, points to certain tentative opinions concerning the general nature of problems which must be dealt with in extending the use of electronic data processing equipment in the various fields of biology and medicine. These observations relate to the nature of biological and medical research itself, to the kinds of applications for electronic data processing equipment which appear possible therein, the characteristics and limitations of the equipment itself, the task of acquiring a research staff and personnel acquainted with the equipment and its use, the kind of investment in effort and expense which these developments will entail.

The following observations are based upon very limited experience. Developments in this field are proceeding so rapidly that any statement at this time must be viewed as subject to probable modification in the future.

Generally, it would appear that there are four major areas of possible application of electronic computers and data processing equipment in medical research:

1. Processing processing

This includes activities involving problems of data processing and data reduction characterized by the need to manipulate large quantities of data in complex manners but involving limited amounts and simple forms of mathematical computations. In this area are the processing of data for statistical and epidemiological studies, the reduction and summarization of data from repetitive experimental observations, and the variety of administrative data processing operations.

2. Mathematical computation

This includes the solution of mathematical problems arising in the analysis of research data such as the solution of differential equations and the mathematical formulation of research problems. Examples of this kind of application follow:

Example 1.—There has been stimulated by the advent of electronic computers, or made applicable by computers, certain conceptually new mathematical methods which have great bearing on problems of biology and medicine. One class of method is the so-called Monte-Carlo method. Here the machine is required to play a game of chance; the rules of this game are given into the machine along with probability distributions (corresponding to a deck of cards or an urn of balls from which drawings are made). Together the rules and distributions are formally equivalent to the equations governing some physical, chemical, or biological process. For example, in assessing damage to tissue by high-energy neutrons the procedure is (roughly) this: Neutrons strike the tissue with a distribution of energies and directions. They have given probabilities of striking atoms of matter of prescribed types in the tissue. Given a collision they have given probability of being captured or scattered, and if scattered a distribution of scattered directions and speeds.

The machine draws from the distribution of energies and directions to obtain values for the first neutron. Then draws for the probability of collision, the probability of capture or scatter, etc., and in this way traces the case history of a single neutron, which may terminate in capture or after a certain number of collisions may emerge from the tissue. Damage is computed on the basis of how many atoms of which type were struck and with what energy. If a large number (10,000 or so) of case histories are traced they in the aggregate comprise the behavior typical of a large number of entering tissue. A single case history computed by hand may take about one man-day with considerable liability to error. The Monte-Carlo method was the first adequate and remains the superior method for such calculations which underlie assessing of damage, choice of material for dosimeters, etc.

Example 2.—Another application is this: Ideally biological cells divide at set intervals of time taking a given time lapse (mitotic time) to divide and "resting" a set interval of time (intermitotic time) between divisions. In actuality there is a distribution of mitotic and intermitotic times and cells do not divide and populations of cells do not increase in number like clockwork. Strikingly there seems to be more randomness in the growth of cancer cells than in normals. The

Maniac, the Los Alamos digital computer, has been made to play "Monte-Carlo-wise" the game which describes the growth of a cell population. For every one of the initial cells the machine draws for the time before division begins, draws for the time it takes to divide, repeats for each daughter cell, etc. At any time the machine can print out the size of the population, the number in mitosis and in intermitosis. These studies suggest many studies (both computational and experimental) yet to be made. In particular because of the random element a transplant of a tumor of given size will not always grow to the same size in the same time. Conversely given the distribution of terminal sizes for a large number of equal-size transplants one could get information on the intermitotic distribution and then study those factors which appear to determine that randomness in tumor cells.

3. Model simulation

This includes the development of mathematical models simulating biological processes which permit experimental variations of characteristics and influences in a manner which permits observing the operation of such systems under a variety of hypothetical circumstances. Illustrations of this kind of application are:

Example 1.—It is well known that the model of the atom supplied by classical physics (that of a nucleus and a planetary system of electrons revolving about it) has been replaced in modern physics by a mathematical equation (the Schrödinger equation of quantum mechanics). We no longer speak of fixed orbits, etc., but the properties of the atom (and similarly of molecules) are computed from the equation. There are in biology similar drastic replacements of simple physical models or concepts by mathematical models or the equations which regulate the behavior of the system. One example is this: the classical picture of the nerve (axon) was similar to a telegraph cable which when sufficiently stimulated conducts the signal or stimulus along its length to higher nerve centers. Modern research has shown that this superficial similarity has as its basis a complicated series of underlying physical and chemical elements. It is no longer profitable to dwell upon the simple manifestations but one now deals with the set of differential equations which describe mathematically the behavior of the stimulated nerve and from which the behavior under various conditions can be predicted. This constitutes an extremely advanced problem in mathematical analysis and and in computation. Exploratory calculations are made by analog machines and final definitive computations are being programed for digital computation.

Example 2.—Through computers, investigators in the biological sciences are becoming increasingly able to deal with the "impossible experiment." An experiment may be impossible because of the complexity of the required setup, because of time and/or expense factors or because it cannot be performed on human beings. It would not be extravagant to assert that the current status of electronic computing owes much to the fact that in the field of nuclear reactor design it is often simpler, better, and less consuming of time and money to do the calculation than to do the experiment. There are comparable situations in biology and medicine wherein it is either desirable or necessary to perform certain experiments and armed with this information to compute results which in principle would be furnished by further experimentation. In the question of radiation damage it is generally agreed that damage consists of two components: a permanent or irreparable component and a reversible or reparable component. The total damage therefore depends upon dose rate, total dose, and the temporal pattern or administration. Now clearly it is quite impracticable if not literally impossible to conduct all experiments to cover all contingencies of dose, rate, and time distribution. The damage process must be formulated mathematically, certain critical experiments performed and from those results the damage from any dose and time distribution predicted. The original rather crude formulations were not simple and the more sophisticated refinements of the theory now being produced represent conceptually difficult and computationally complex problems.

4. Data retrieval

This includes, the complex problems of the storage, search, correlation, and retrieval of scientific information which includes the related field of the development of mechanical translation of languages and abstracting of scientific literature. In this area exist some of the most difficult and important problems facing the furtherance of scientific effort today. Foremost among these is the need for electronic means to store, search, and retrieve in a rapid and flexible manner the vast accumulation of scientific literature and the ever-expanding increment of such knowledge as the pace and scope of scientific endeavor accelerates.

A less known but highly significant version of this problem is that of relating the chemical and physical characteristics of substances with their biological activity to ascertain the unique causal factors as a prelude to the synthesis of substances capable of producing specifically sought-for biological effects. This particular problem is being explored in the cancer chemotherapy program of the NIH. Another variant is presented in the following:

Example 1.—The important high molecular weight molecules in biology consist of many simpler building blocks. Proteins are made from large numbers of amino acids. There are known about 30 different amino acids. If a protein consisted of 288 amino acids equally distributed among 12 kinds the possible number of arrangements of these is 10^{311} (or 1 with 311 zeros). By and large the amino acid contents of various proteins are not strikingly different. We are forced to conclude that an enzyme or hormone possesses its unique properties because of the unique arrangement of its amino acids. Thus insulin behaves as insulin and not as egg white because of the sequential arrangement of its amino acids. Due to recent breakthroughs in physico-chemical methodology the actual sequence has been established in some important proteins, including insulin. Such information is rapidly being established for many proteins. Shortly the following problem will arise: To tabulate, code, and store this available information in such a way that it may be retrieved at will and compared to newly established sequences. Thus, an investigator may ask what parts of a newly established sequence, if any, have been shown to occur in a previously established one. This requires comparing all possible subsequences of the new to all possible subsequences of the old. Since all enzymes, antigens, and antibodies and most hormones are proteins and the most important natural molecules are of this "building block" type, this problem of storage, retrieval, and comparison will truly become astronomical and quite impossible in the absence of adequate electronic equipment.

5. Potential use in diagnosis

It is possible to build a "logical computor" and considerable work is being done at the present time on such machines. Such a machine given a set of rules will accept a set of statements and announce whether or not they are logically consistent. One form of the input is that certain statements are axioms and others are conclusions or theorems. Thus one can ask such a machine if one or more statements follow from a given set of statements. Such consistency checks embody the main features of diagnosis. If the presence of such and such attributes and the absence of other defines the diagnosis of a given state than a machine could in this sense diagnose. When the number of attributes is very large and the alternatives numerous this small form of diagnosis may be worth mechanizing, particularly when very large numbers of such diagnoses must be made. Actual diagnosis, of course, is not so simple and the insight of the physician will always be needed. Nonetheless, exploratory studies of a highly tentative nature have been made with a view to constructing a machine which would indicate probable diagnoses on the basis of certain input information derived from laboratory findings.

Closely related to the problem of diagnosis is what may be referred to as "mathematical characterization of physiological and pathological states." For example, if the rate at which an administered isotope is removed from the blood stream is different from normal, this may indicate certain probable disorders. However, in many cases the dynamics of such removal are subject to description by differential equations containing parameters with physiological significance. The analysis of curves in terms of these equations can indicate abnormal values for one or more of these quantities. Indeed, abnormal values may occur without the curve visibly or manifestly departing from normal. The possibility thus exists of employing the mathematical analysis of certain response curves to pinpoint abnormal states for earlier and in a more precise manner than has been possible.

PROBLEMS OF FURTHER DEVELOPMENT

Some very substantial problems must be faced in extending the use of computers into the field of medical and biological research. First and foremost is the complex character of this field of study. By its very nature, biology requires the examination and comprehension of more factors, variables, and influences than any other science. The conceptual task of synthesizing the vast amount of information required to understand the complex machinery of living beings in forms and methods which permit the application of such powerful instruments as electronic

computers is a formidable one. This problem is basically twofold in nature, involving:

(*a*) The adaptation of data-processing techniques and people skilled therein to the needs of medical research; and

(*b*) Acquainting research investigators and scientists with the rapidly developing potentialities of such equipment and the logical and mathematical conceptualization essential to productive employment in medical research.

It is these difficult problems which occupy our principal attention at the present moment.

It does appear that the extent of investment in people of high technical attainment in the application of electronic methods may exceed our original expectations. Such individuals are not easy to find, and are actively sought by industry and the military services for their own important developments in this area. In like manner, effort to adapt laboratory methods and techniques to provide data suitable for machine processing, and encouraging the sophisticated conceptualization of research problems to productively exploit the potentialities of electronic equipment, is in large part a task which we are just beginning to tackle.

Looking to the future, the potentialities in this area appear considerable. Though, in a sense, the capability and speed of the machine in dealing with data-processing and computational problems seem to transcend our present capacity to conceive and formulate data-processing and research problems, this is but momentary. We plan an intensive attack upon the problems of collecting and communicating laboratory data for machine processing, the conceptual formulation of research problems, and effective machine utilization.

We hope to be able to provide leadership in exploring and developing analytical methods in biology and medicine. In this development, we hope to enlist the cooperation of the research and developmental staffs of major manufacturers of computing equipment. We are attempting also to encourage and stimulate the extension of computer use in biological research in university and other non-Federal organizations. A specific step in this direction has been a grant to the National Research Council to permit that organization to carry out a national survey of the present uses of analytical computers in biology and medicine and to prepare a monograph which will facilitate the employment of this equipment by investigators in this field. In addition, certain members of the professional staff of the National Institutes of Health are cooperating with the Institute of Radio Engineers to develop an international conference of all those concerned with health applications.

We are at the threshhold of enormously significant developments, in research instrumentation, in the conceptual view of biological phenomena, and in the processing, correlation and retrieval of scientific information. The obstacles and problems to be overcome in realizing the promise of these developments are formidable and will require a heavy investment of our best talents and no little portion of our resources.

APPENDIXES

STAFF MEMORANDUM

COMMITTEE ON GOVERNMENT OPERATIONS,
July 11, 1958.

Staff Memorandum No. 85–2–30 SR.

Subject: International Aspects of Scientific and Technical Documentation and Exchange of Scientific Information.

During the hearings before the Subcommittee on Reorganization on those portions of the Science and Technology Act of 1958, which relate to the development of a comprehensive program for the coordination of scientific and technical information, the subcommittee directed the committee staff to compile material relative to the international aspects of scientific and technical documentation and the exchange of information.

Following discussions with representatives of the National Science Foundation and the Department of State, appropriate materials were compiled by those agencies and submitted to the committee staff. Independent research in these fields was also conducted by the staff, assisted by the Science and Technology Division, Reference Department, Library of Congress, with a view to the development of additional material which might be pertinent to the subject under examination.

The materials submitted by the National Science Foundation consisted of a partial list of international governmental and nongovernmental organizations which engage in documentation activities in scientific, technological, and related fields; a list of national research councils which carry on information activities; and a list of national documentation centers.

The material relative to international governmental and nongovernmental organizations is broken down into intergovernmental organizations and international nongovernmental organizations. Activities in the latter category have been broken down further into five subdivisions: (*a*) Documentation; (*b*) science; (*c*) agriculture; (*d*) medicine; and (*e*) engineering, transportation, and communications. These materials are attached hereto as appendix I. In addition to a listing of the various agencies throughout the world which are engaged in scientific and technical documentation and other related activities, including exchange of information, appendix I indicates briefly for each organization the nature of the activity and the principal publications.

The material relative to national research councils is attached hereto as appendix II. It covers 24 countries and shows the nature of the activity and the principal information services performed. The material relative to national documentation centers, attached hereto as appendix III, also covers 24 countries and contains a brief summary of the documentation functions performed.

It appears that there are some 16 intergovernmental and 54 nongovernmental international organizations which engage in documentation activities relative to science, technology, and allied fields. Detailed information concerning these activities is set forth in appendix I,

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attached hereto. It should be noted, however, that the principal work in this field is being carried on by UNESCO (United Nations Educational, Scientific, and Cultural Organization). Attached hereto as appendix IV is an article by Dr. J. E. Holstrom, Department of Natural Science, UNESCO, describing these activities. An article by Dr. Burton W. Adkinson, Head, Office of Scientific Information, National Science Foundation, discussing the international utilization of recorded knowledge, is attached hereto as appendix V.

ELI E. NOBLEMAN,
Professional Staff Member.

Approved:
WALTER L. REYNOLDS, *Staff Director.*

APPENDIX I. PARTIAL LIST OF INTERNATIONAL ORGANIZATIONS WITH DOCUMENTATION ACTIVITIES

I. INTERNATIONAL GOVERNMENTAL ORGANIZATIONS

A. UNITED NATIONS ECONOMIC, SOCIAL, AND CULTURAL ORGANIZATIONS

1. UNESCO

UNESCO is the one organ of the United Nations, whose activities in the fields of librarianship, bibliography, and documentation are the most numerous and varied. Although the United Nations and the other specialized agencies are active in these fields, it is only in UNESCO's program that bibliographic control, as such, is dealt with. A number of national bibliographic centers, public library pilot projects, and national and regional scientific documentation centers have been created with technical and financial assistance supplied by UNESCO. It has also operated a clearinghouse for libraries to aid in the international exchange of publications.

UNESCO's plans to establish international research laboratories have been abandoned with the single exception of the European Council for Nuclear Research which is now building a center in Geneva for 11 cooperating European nations. UNESCO has been most successful in instituting services and projects designed to promote science on the broadest possible fronts.

The Department of Natural Sciences of UNESCO operates science offices in regions deficient in scientific knowledge: in Uruguay for Latin America, in Egypt for the Middle East, in India for south Asia, and in Indonesia for southeast Asia. Experts initiate demonstration projects, introduce and improve science teaching in schools and universities, and produce reference manuals and essential equipment to meet shortages of texts and equipment. The Department initiates special research in underdeveloped areas, such as papermaking in Brazil, harbor construction in India, and the study of earthquakes in Turkey. Science clubs and traveling exhibits are organized. Six major and several regional exhibits have been viewed by millions around the world, including the present International Geophysical Year exhibit which opened in Paris in December 1957.

UNESCO provides international machinery for professional organizations by supplying grants-in-aid for holding meetings and publishing findings. To coordinate research on an international scale approximately $200,000 is granted annually to the International Council of Scientific Unions and similar organizations set up for the medical and engineering sciences: Council for International Organizations of Medical Sciences and Union of International Engineering Organizations. The documentation activities of these organizations are considered separately below.

Publications.—Arid Zone Research and Humid Tropics Research (published irregularly); Impact of Science on Society (a quarterly devoted to applied and social aspects of science); Index Translationum; International Bibliography of Translations (scientific sections); Bibliography of Scientific Publications of South and South East Asia (monthly); List of Scientific Papers Published in the Middle East; Unesco Courier (popular scientific monthly); Scientific Institutions and Societies in Latin America; Source Book for Science Teaching; and International Advisory Committee on Research in the Natural Science Programme. Meeting (annual).

2. International Advisory Committee for Documentation and Terminology in Pure and Applied Science (UNESCO)

The Committee is concerned with questions of abstracting, improving the relations between primary research journals and bibliographic journals, and searching and retrieval (of patents as well as literature) by mechanical and conventional means.

Publications.—Monthly Bulletin on Scientific Documentation and Terminology; Scientific and Technical Translating and Other Aspects of the Language Problem; Bibliography of Monolingual Scientific and Technical Glossaries; Bibliography of Interlingual Scientific and Technical Dictionaries.

3. *World Health Organization (WHO)*

The objective of this Organization is "the attainment by all peoples of the highest possible level of health." The documentation interest of WHO comes within the broad heading of the Central Technical Services. This Service covers international work in health statistics, biological standardization, unification of pharmacopoeias, epidemiological intelligence services, a library service, and the issuance of a large number of technical periodicals and other scientific publications.

Publications.—Bulletin of the World Health Organization (WHO'S principal scientific publication containing articles in either English or French); Chronicles of the World Health Organization (monthly containing general information and summaries of its principal technical publications in English, French, Spanish, Chinese, and Russian); International Digest of Health Legislation (gives extracts, or reproduction from national laws and regulations dealing with health matters in English and French); Annual Epidemiological and Vital Statistics, 1939–46 (a successor to the Annual Epidemiological Report published by the League of Nations Health Organization covering the years 1923–1938. Part I, Vital Statistics and Causes of Death, Part II, Causes of and Deaths from Notifiable Diseases, published in English and French); Epidemiological and Vital Statistics Report (issued monthly bilingual English and French); Weekly Epidemiological Record (contains notification concerning the quarantinable diseases, bilingual English and French); Official Record of the World Health Organization (contains reports and documents of WHO in English and French); Technical Reports Series (reports of WHO committees and other advisory bodies in English and French); Monograph Series (contains scientific studies and reports originally published in the Bulletin of the World Health Organization in English and French); Pharmacopoea Internationalis (establishes international standards and nomenclature for drugs in general use. Published in English, French, and Spanish); Catalogue of Publications (issued yearly, lists all WHO publications and indicates all languages for each publication. (Issued in English and French.)); Newsletter (monthly containing popular health articles in English and French).

4. Food and Agriculture Organization of the United Nations (FAO)

The Organization's main purpose is the raising of agricultural production and standards of living throughout the world. One of its objectives is to collect, analyze and disseminate information relating to nutrition, food and agriculture. FAO maintains a Library and publishes in English, French and Spanish numerous monographs, reports and periodicals. These publications are located in over 55 depository libraries throughout the world.

Publications.—The following is a sample of the types of publications:

Annuals: Work of FAO (Report of the Director-General); Activities of FAO under the Expanded Technical Assistance Program; State of Food and Agriculture; Food and Agricultural Statistics; Fisheries Statistics; Forestry Statistics.

Periodicals: Bibliography of Forestry and Forest Products (monthly); Fisheries Bulletin (bimonthly); Legislative Report (monthly); Food and Agriculture Legislation (quarterly); World Fisheries Abstracts (bimonthly); Unasylva (quarterly); Monthly Bulletin of Agricultural Economics and Statistics.

Reports and monographs: Soil Conservation—an International Study; Improving the World's Grasslands; Legumes in Agriculture.

Reviews: Fisheries Technology Literature (appears in card form).

5. International Telecommunications Union (ITU)

The main objective of this Union is to maintain and extend international cooperation for the improvement and rational use of radio, telegraph, telephone and related equipment. The ITU occasionally collaborates with the International Federation for Documentation and maintains a specilized telecommunication library.

Publications.—Telecommunication Journal (monthly in English, French and Spanish containing technical articles. Also includes a complete list of ITU publications for sale). Other types are: Maps; charts; statistics; list of frequencies; list of call signs; documents of international conferences held by the Union; tables of rates.

6. International Civil Aviation Organization (ICAO)

The main purpose of this Organization is to develop the principles and techniques of international air navigation and to encourage, organize and regulate all aspects of international civil aeronautics. They maintain a library and publish technical, economic and legal documents in English, French and Spanish.

Publications.—ICAO Monthly Bulletin (General information); Index of ICAO Documents and Working Papers (monthly in English only); Other types are: Operational standards; regional manuals; and multilanguage dictionaries.

7. World Meteorological Organization (WMO)

One of the functions of this Organization is to promote the establishment and maintenance of systems for the rapid exchange of meteorological information.

The WMO is also attempting to standardize meteorological observations. It prepares thunderstorm frequency maps and is organizing an international cloud atlas. The Geneva headquarters houses the International Meteorological Data Centre for the International Geophysical Year and publishes and distributes, in microcard form, worldwide meteorological data collected during the IGY.

Publications.—Bulletin of the World Meteorological Observations (quarterly includes articles of current interest, published in English and French); International Meteorological Bibliography (quarterly printed on one side to facilitate cutting out for catalogues). Other publications include: Reports on meetings annual reports, technical notes, and manuals.

B. REGIONAL AND OTHER INTERNATIONAL ORGANIZATIONS

1. North Atlantic Treaty Organization (NATO)

The activities of NATO include information exchange and cultural relations, particularly by the Advisory Group for Aeronautical Research and Development—AGARD. The activities of the AGARD Documentation Committee include: Cooperation with the International Federation for Documentation, cooperation with other groups on scientific translations, compilation of dictionaries, study of subject classifications, and expansion of abstracting services.

Following the NATO Conference in Paris, held from December 16–19, 1957, a declaration and communique, dated December 19, was issued, a portion of which dealt with scientific and technical cooperation, as follows:

"SCIENTIFIC AND TECHNICAL COOPERATION

"* * * We recognize that in most of our countries more should be done to increase the supply of trained men in many branches of science and technology. * * * We realize that progress will depend on vigorous action within individual States and in particular on the devoted contribution of teachers and scientists. We must increase the provision for the training of young people in scientific and technical subjects and we must also insure that the free pursuit of fundamental research continues to flourish. Each of our governments will therefore reappraise the support being given to scientific and technical education and to fundamental research.

"* * * We seek to increase the effectiveness of national efforts through the pooling of scientific facilities and information and the sharing of tasks. * * * Our Governments will support the international organizations doing work in this field.

"* * * We have decided to establish forthwith a Science Committee on which all of the NATO countries will be represented by men highly qualified to speak authoritatively on scientific policy. In addition, a scientist of outstanding qualifications will be appointed as Science Adviser to the Secretary General of NATO.

"* * * The Science Committee will be responsible for making specific recommendations to the Council for action on a proposal * * * for a Western Foundation for Scientific Research and on the many other valuable proposals which have been put forward by the NATO Task Force on Scientific and Technical Cooperation and by the NATO Parliamentarians Conference."

AGARD Publications.—Handbook of Sources of Aeronautical Information; The Layout of Technical Reports; Multilingual Aeronautical Dictionary.

NATO Publications.—North Atlantic Treaty Organization (annual in English and French).

2. Organization for European Economic Cooperation (OEEC)

The Organization has a document exchange system which provides member countries with scientific and technical information not available through commercial channels such as government reports and administrative documents. They cooperate with other organizations on scientific translations and information exchange. They maintain a Library and Reference Branch. OEEC publishes reports on economy, statistics, energy, industry, technology, business management, productivity, and agriculture.

The EPA (European Productivity Agency) is an international body working within the framework of the OEEC. It was established in May 1953 to promote the widest possible application of the latest technical know-how, managerial skills, and sociological methods in European industry, commerce, and agriculture. It comprises a Committee for Applied Research (CAR) including members who are directly in charge of national research organizations and others who are closely concerned with national scientific developments in their own countries.

Publications.—The following describe or list current documents: The General Catalogue and its Yearly Supplements (lists reports of OEEC and EPA in the economic and productivity field); European Technical Digests (monthly; describes technological innovations developed in 13 different countries selected from some 1,000 technical journals); The Information Leaflets (issued for each new publication and contains an analysis of the work); The Periodical "Book Preview" (issued every two months and lists recent publications and those in preparation).

3. Organization of American States (OAS)

(The General Secretariat and permanent central organ of which is the Pan American Union.)

This Organization was founded by the International Conference of American States and incorporates all the aims of Pan-Americanism. Serves as custodian of the documents and archives of the Inter-American Conference. Also has worked closely with UNESCO to coordinate bibliographic activities in Latin America. The library is the coordination and cooperation center for Inter-American bibliography.

Publications.—Americas (monthly published in English, Spanish, and Portuguese); Annals (quarterly in English, Spanish, Portuguese, and French); Review of Inter-American Bibliography (quarterly with four official languages in one edition); Estadistica (quarterly with four official languages in one edition); Forthcoming Inter-American Conferences and Meetings (published in English, Spanish, and Portuguese); Catalogue of Publications and Films; Monthly List of Accessions; Union List of Latin American Newspapers in Libraries in the United States; Inter-American Juridical Yearbook; Bibliography of Selected Statistical Sources of the American Nations; miscellaneous bulletins and reports, scientific dictionaries.

4. Scientific Council for Africa South of the Sahara (CSA)

One of the functions of this Council is to compile, maintain and distribute scientific information and to foster the creation in Africa of centers of specialized documentation. Promotes periodic conferences of a general scientific character and facilitates meetings of groups of specialists.

Publications.—A directory of some 240 general and specialized scientific and technical libraries in Africa south of the Sahara. A list of scientific societies in the area; Systematic Botanists and Zoologists Working in Africa.

5. International Atomic Energy Agency IAEA

A reports and data center is presently being established.

6. Inter-American Institute of Agricultural Sciences

The main purpose of the Institute is to encourage and advance the agricultural sciences in the Americas. It has seven departments as follows: Agricultural economics, agricultural engineering, animal industry, plant industry, renewable resources, scientific communications and library.

Publications.—Annual Report; Turrialba (technical journal); Information Bulletin; Cacao.

7. Inter-African Bureau for Soils and Rural Economy (BIS)

One of the main purposes of this Bureau is to assemble and disseminate documentation in its field of interest. In this connection it has created an information and document center specializing in various aspects of erosion, ecoclimatic observations in relation to soil conservation, protection of vegetation, fighting brush fires, hydrology, pasture improvement, rationalization of crops, and study of the use of fertilizers

Publications.—Bibliographical Bulletin (monthly published in English and French); Sols Africains (quarterly in English and French).

8. Inter-African Bureau for Epizootic Diseases (IBED)

The function of this Bureau is to maintain an information center on the technical and economic aspects of the infectious and contagious diseases of livestock in Africa. Also collects and disseminates all relevant information on the control and research of these diseases and promotes meetings between experts.

Publications.—Bulletin of Epizootic Diseases of Africa (quarterly published in English and French); Information Leaflet (weekly in English and French); Quarterly Summary of Incidence of Epizootic Diseases in Africa.

9. Indo-Pacific Fisheries Council (IPFC)

The purpose of this Council is to identify and endeavor to solve the fisheries problems in the Indo-Pacific area, disseminate and exchange information, and promote and organize training centers on subjects relating to fisheries. A series of handbooks and a register of fisheries institutions are being prepared.

Publications.—Annual Proceedings; Special Publications; Current Affairs Bulletin; Handbooks; List of Scientific and Other Periodicals Published in the Indo-Pacific Area.

10. International Office of Epizootics (IOE)

One of the functions of this Office is to collect documents and facts relating to the pathology or prevention of contagious diseases of livestock and disseminate to governments and their sanitary service. They maintain a specialized library which performs bibliographic research for veterinary surgeons.

Publications.—Technical and Statistical Bulletins.

II. International Nongovernmental Organizations

A. DOCUMENTATION

1. International Federation of Library Associations (IFLA)

The purpose of this federation is to promote international library cooperation. It holds international congresses and sponsors regional meetings. It has 14 committees, such as parliamentary libraries, serial publications, library statistics, cataloging, etc. An example of its activities is the establishment of an international agreement on an international lending system.

Publications.—Actes du Cooseil de la FIAB (1931–53, 18 volumes); Actes du 11 Congrès international des Bibliothèques (3 volumes); Répuertoire des Associations de Bibliothécaires membres du la Fédération Internationalc.

2. International Federation for Documentation (FID)

The Federation's main purpose is to develop international principles and practice of documentation through meetings, studies, and publications. It maintains Committees on the Theory of Classification, the Universal Decimal Classification, Bibliography and Abstracting, Information Services, Technical Means of Documentation, Mechanical Selections, and Training. One of the notable activities of the Federation is continuing work on the development and revision of the Universal Decimal Classification system.

Publications.—Review of Documentation (including the monthly bulletin FID–Informations); Projets d' extension (notes); Extensions and Corrections to the UDC; Conference Reports; Manual on Document Reproduction and Selection (1953); Index Bibliographicus (directory of periodicals containing bibliographies and abstracts, 1952); Directory of Microfilm and Photocopying Services (1950); Studies on Classification (1948); Manuel du repertoire bibliographique universel (first edition, 1905); 2d edition, Classification Decimale Universelle (1927–33, complete editions of the UDC in English, French, and German. Abridged editions in Czech, Dutch, English, French, German, Italian, Japanese, Polish, Roumanian, Spanish, and Swedish).

3. Association for the Utilization and the Diffusion of Documents, (UDD)

The general purpose of the Association is to contribute to the development of creative activity in the industrial field by the effective use of French and foreign public documentary resources. It maintains a microfilm library and has made available to the public, documentation of German origin gathered by the Allies at the end of World War II and inaccessible research material.

Publications.—Bulletin d'information scientifique et technique; Bulletin analytique des Brevets francais; and various documents.

4. Inter-American Bibliographical and Library Association

The purpose of this Association is to furnish investigators, research workers, students, writers, etc., with information on bibliographical sources. Maintains a clearinghouse for requests about organizations, libraries, or individuals known to possess or have access to bibliographical sources. Undertakes bibliographic library work, in cooperation with other agencies in the Americas, and publishes bibliographical and library aids.

Publications.—Thirteen volumes on general subjects of bibliographical interest; 6 volumes of publications of conference proceedings; Reference Index to 12,000 Spanish American Authors; Inter-American Bibliographical Review (1941–44); Doors to Latin America (since January 1954).

5. International Office of Railway Documentation

The purpose of this Office is to collect and disseminate to its members all documentation of interest to railway administrations and to societies working for the railways. It maintains a library, documentation office, technical translation office, photographic and microphotographic laboratory. An analysis of 500 railway and technical reviews is made regularly. Prepares technical dictionaries in several languages, and educational and documentary films.

Publications.—Bulletin de Documentation (monthly in English, French, and Spanish); La Classification decimale du BDC.

6. International Union of the Medical Press

The main purpose of this Union is to promote collaboration between medical publications in different countries. It disseminates important items of information, and has established international prizes for publications which contribute most to the progress of the medical sciences.

7. Dental Documentary Foundation (DDF)

The purpose of this Foundation is to collect and utilize literature on odontology and stomatology from all parts of the world. It has established a center of bibliographic research, and maintains a public library.

Publications.—Information Bulletin (irregular); Sommaire des periodiques dentaires et stomatologiques (every 2 months).

B. SCIENCE

1. International Council of Scientific Unions (ICSU)

Members of this Council are international unions in various fields of science. The Council has established the ICSU Abstracting Board. The Board's aim is to coordinate and facilitate the work of scientific abstracting services and journals. It has done extensive work on abstracting in the field of physics.

2. International Astronomical Union (IAU)

The purpose of this Union is to encourage international coordination among astronomers and promote the study of astronomy in all its branches. The Central Bureau for Astronomical Tables is a center for the exchange of information on astronomical observations which was organized and is maintained by the Union. It also supports the International Time Bureau and the International Latitude Service. Is a member of ICSU. The Union has cooperated with UNESCO in making a study of bibliographic lacunae in Astronomy.

Publications.—Transactions of the International Astronomical Union; Astronomischer Jahresbericht; other technical and scientific documents.

3. International Astronautical Federation (IAF)

The Federation promotes the peaceful achievement of space flight, dissemination of information, and research on astronautical subjects. It has annual congresses which present scientific and technical papers. Also has an archive and astronautical library. Maintains committees on multiple-language glossary, a library classification scheme for astronautical terms, and standardization of astronautical nomenclature.

Publications.—News Bulletin.

4. International Mathematical Union

The Union promotes international cooperation in mathematics, supports and assists conferences, scientific meetings, and congresses. It sponsors work on a world directory of mathematicians, abstracting and reviewing, directory of mathematical symbols and mathematical instructions. Member of ICSU.

Publications.—International Mathematical News Bulletin (published by the Oesterreichische Mathematische Gesellschaft); Record of the First General Assembly (March 1952); Annual Report of the Executive Committee to the National Adhering Organizations.

5. International Union of Pure and Applied Physics (UIPPA)

The Union coordinates the work of preparation and publication of abstracts of papers and of tables of physical constants. Also seeks international agreement on matters of units, standards, nomenclature, and notations. Member of ICSU. It has specialized Commissions on Symbols, Units, and Nomenclature; Publications and Acoustics. Participates in a Joint Commission on Physics Abstracting.

Publications.—Proceedings of Congresses; publishes with grant-in-aid from UNESCO various directories and circulars.

6. International Union of Crystallography (IUCr.)

The Union promotes international publications of crystallographic research and of crystallographic works; facilitates standardization of methods and of units in crystallography. Member of ICSU.

Publications.—Structure Reports (a periodical review of recently published crystal-structure determinations); International Tables for X-Ray Crystallography (tables of mathematical and physical data for crystal-structure research); Acta Crystallographica (monthly).

7. International Union of Pure and Applied Chemistry (IUPAC)

The union has a special Committee on Tables of Constants and Commissions on (1) Physico-Chemical Symbols and Terminology; (2) Physico-Chemical Data and Standards; (3) Inorganic Chemistry Nomenclature; (4) Organic Chemistry Nomenclature; (5) Codification, Ciphering, and Classification of Organic Compounds; (6) Biochemistry Nomenclature; (7) Protein Standards; (8) Physico-Chemical Data of Analytical Interest; (9) Analytical Terminology and Symbols. The Special Committee on Tables of Constants collects and publishes numerical data in chemistry and physics. The Editorial Office acquires all scientific and technical periodicals containing numerical data. Member of ICSU.

IUPAC publications.—Proceedings of Conferences; special reports such as Tables of Reagents for Mineral Analysis (in three languages); Reagents to be Recommended; Unified Methods for the Analysis of Fatty Substances.

Committee on Tables of Constants Publications.—Annual tables (volumes); Annual Tables (monographs); Indexes (1910–1930 and 1931–1936); Tables of Selected Constants (monographs).

8. International Union of Biological Sciences (IUBS)

The Union consists of the following sections: Biometry, Botany, Cell Biology, Embryology, Genetics, Limnology, Microbiology, and Zoology. One of its purposes is to promote the preparation and publication of bibliographies. They have established a Committee for Biological Documentation to investigate present practices and needs in the documentation and exchange of literature. Member of ICSU.

Publications.—Reports and Minutes of General Assemblies; Reports of Colloquia; L'Annee biologique (abstracting review on general biology); Resumptio Genetica (Bimonthly with summaries in English, French or German); Zoological Record (annual); Index des geneticiens; Index des Zoologistes; and other publications.

9. International Commission on Zoological Nomenclature

The Commission submits from time to time to the International Congress of Zoology, recommendations either for amendments to the International Code of Zoological Nomenclature or for the additions of recommendations to be added to particular articles of the code. It renders opinions on questions of zoological nomenclature submitted to it and compiles the Official Lists of Generic Names in Zoology and of Specific Trivial Names in Zoology.

Publications.—Official List of Generic Names in Zoology (some 300 opinions); The Bulletin of Zoological Nomenclature.

10. International Association of Microbiological Societies

The Association has a permanent International Committee on Bacteriological Nomenclature. Maintains a collection center for micro-organisms.

Publications.—International Bulletin of Bacteriological Nomenclature and Taxonomy; Proceedings of Congresses.

11. International Geographical Union

The Union has a Commission on Bibliography of Ancient Maps, which is preparing for publication a bibliography of all existing maps from the earliest times to the 17th Century. It also has a Commission on Bibliographic Classifications of Geographic Maps and Publications that has completed a survey of libraries regarding their collections, classification and any special system used with maps.

Publications.—International Bibliography of Geography (annotated); International Bibliography of Cartography (annotated); World Directory of Geographers (English and French text); Newsletter (biannually in English and French).

12. International Association of Geodesy (IAG)

The Association sponsors general documentation in the field of geodesy. It supports the Isostatic Institute in Helsinki, Central Bureau in Paris, which has organized an important International Geodetic Bibliography. This bibliography gives a complete index of all articles on geodesy published in any country.

Publications.—The Geodetic Bulletin (every 3 months); Geodetic Bibliography (normally every 3 years); special publications and general reports.

13. International Association of Vulcanology (IAV)

The Association collects and maintains a collection of reports dealing with the progress of vulcanological research. It also distributes information to those interested in vulcanology.

Publications.—Bulletin Volcanologique (series I, 12 vols.; series II, begun in 1937, 15 vols.). A catalogue of volcanoes of the world is in course of preparation. The first part, Indonesia, and the second part, Philippines and Cochin China, are issued.

14. International Society of Soil Science (ISSS)

The Society has a Commission on Classification and Cartography. It assists the Food and Agriculture Organization of the United Nations in the preparation of the multilingual vocabulary of science terms.

Publications.—Bulletins; transactions of international congresses and commission meetings.

15. International Union of History of Sciences (IUHS)

The Union among others has scientific Commissions on (1) Bibliography, and (2) Publications. It maintains a bibliographical card index and library. Member of ICSU.

Publications.—Archives internationales d'Histoire des Sciences (quarterly); many other publications.

C. AGRICULTURE

1. International Federation of Agricultural Producers (IFAP)

The Federation engages in the exchange of economic and technical information.

Publications.—IFAP Monthly Bulletin (in English and French); World Farm News (monthly for press and radio, in English); World Agriculture (quarterly review in English and French); Reports of ordinary general meetings. Various books and brochures.

2. International Dairy Federation (IDF)

The Federation maintains the following Study and Special Commissions: Cheese, Condensed Milk and Milk Powder, Dairy Economics, Dairying in Warm Countries, Industrial Dairy Technique, the Production and Control of Milk and the Standardization of Methods of Analysis.

Publications.—International Dairy Federation (1903–53, history); Handbook of Information: Various studies and reports.

3. Dairy Industries Society International (DISI)

The Society disseminates scientific, technological, economic, dietary, and other related information to members.

Maintains among others United States of America Committees on Standard Terminology and Publications. Has an International Dairy Museum in Philadelphia and has established an Information and Consultation Center.

Publications.—Bulletin of recent worldwide technical, bibliographical, and miscellaneous dairy informations; Confidential Report to Members (in English and Spanish); Basic Handbooks; Glossary of Dairy Terminology, and various other publications.

4. International Center of Antiparasitics

One of the activities of this Center is the establishing of information services.
Publications.—Report of the 1st International Congress.

5. International Center of Fertilizers (CIEC)

One of the purposes of the Center is to provide information services dealing with fertilizers.
Publications.— Reports on conferences and meetings. Bulletin (quarterly in French).

6. International Union of Forest Research Organizations

One of the aims of the Union is the exchange of scientific information and ideas. It has 11 research sections, one of which is bibliography. The Union has a library and is developing a bibliographic classification system for forestry. A joint bibliography committee is maintained in cooperation with the Food and Agriculture Organization. The Committee is concerned with effective documentation of forestry literature, maintenance and review of a classification system for forestry and national forestry terminologies.
Publications.—Proceedings of the congresses; Oxford System of Decimal Classification for Forestry, 1954. Various books and studies.

7. International Association of Wood Anatomists (IAWA)

The Association maintains subcommittees working on definition of terms, standardization of term sizes, and the development of a universal card-sorting method of timber identification.
Publications.—Glossary of Terms Used in Describing Woods; News Bulletin (biannually).

8. International Association of Agricultural Librarians and Documentalists

The program of the Association includes publication of a directory of libraries and documentation centers in agriculture, a list of current agricultural bibliographies, and a revision of the classification scheme for agricultural science.
Publications.—Quarterly bulletin (which endeavors to record all new periodicals and reference works in agriculture and related fields).

D. MEDICINE

1. Council for International Organization of Medical Sciences (CIOMS)

The purpose of the Council is to facilitate exchange of views and scientific information in the medical sciences by securing continuity and coordination between international associations of medical sciences. It is working on the standardization of medical nomenclature. The Council has taken over the duties of the former Coordinating Committee on Abstracting and Indexing in the Medical and Biological Sciences.
Publications.—Bulletin (in English and French); Calendar of International Medical Congresses (biannually); Proceedings of symposia.

2. International Hospital Federation (IHF)

The Federation maintains an International Information Bureau on all matters connected with hospital service.
Publications.—News Bulletin (quarterly in English and French); International Hospital Directory (in preparation).

3. International Center for Medical and Surgical Films

The purpose of this Center is to develop the use of films in education, documentation and research in biology, anatomy, physiology, and surgery. It has offered the universities of each country a library of international medical films. 250 films have been collected from Belgium, France, Switzerland, U. S. S. R., United Kingdom, United States of America, etc.
Publications.—Programs of Activities and of Films Presented; Revue du Film Médical et Chirurgical (biennial, supplement to La Semaine Médicale).

4. International Federation of Masseurs, Medical Gymnasts, and Physiotherapists

The Federation acts as an information and liaison center between the national groups. It has a documentation center which endeavors to answer all questions on massage, medical gymnastics, and physiotherapy.

Publications.—International Review of Kinesitherapy; Congress Proceedings.

5. International Federation of Physical Medicine

One of the aims of the Federation is to collect and exchange information on matters pertaining to physical medicine, between members of the Federation.

6. International Union Against Cancer

The Union serves as an international center for documentation on all questions relating to cancer.

Publications.—Acta (quarterly containing the proceedings of the International Congresses on Cancer. Each paper is published in its original language with a summary in English, French, German, Russian, and Spanish).

7. International Union Against Tuberculosis (IUAT)

The Union maintains a specialized library on tuberculosis. The Secretariat's office is a research and information center.

Publications.—Bulletin (quarterly in English and French); Proceedings of conferences.

8. World Federation for Mental Health (WFMH)

One of the purposes of the Federation is to facilitate the collection and dissemination of information in the field of mental health.

Publications.—World Mental Health (formerly the Bulletin, issued four times a year in English, with occasional articles and translations in French and Spanish); annual reports; Mental Health and World Citizenship (1948); International Catalogue of Mental Health Films; bibliographies; A Survey of Four Years' Work of the Federation; Proceedings of congresses.

9. International Association for the Prevention of Blindness (IAPB)

One of the aims of this Association is to disseminate knowledge on all matters pertaining to the care and use of the eyes. In this connection it maintains a center of information which loans films and propaganda material.

Publications.—Journal d'Ophtalmologie sociale (published in English and French); Proceedings of Congresses; reports on special subjects.

10. International Dental Federation (FDI)

The Federation has sponsored studies and contributions toward the advancement of dental hygiene and public dental services. It maintains a collection of professional documentary material. It also has studies and proposals relating to dental teaching and legislation.

Publications.—International Dental Journal; Quarterly Newsletter; A History of the Federation Dentaire Internationale.

E. ENGINEERING, TRANSPORTATION, COMMUNICATIONS

1. Union of International Engineering Organizations (UIEO)

The Union has a Technical Dictionary and Documentation Committee which coordinates the terminological efforts of the member organizations. It is also concerned with methods of preparing abstracts, and more effective presentation of technical information. The Committee maintains a consolidated index to the heading of chapters and subdivisions of dictionaries in preparation by member organizations in order to avoid duplication of effort. The index is on cards and may be consulted in UNESCO's Natural Sciences Department. The Union collaborates with UNESCO in the survey of scientific research being carried out by the Social and Economic Council of U. N.

2. International Air Transport Association (IATA)

The Association acts as a central bank of information and technical knowledge for all member airlines, conducts such enterprises as the clearinghouse.

Publications.—IATA Bulletin (issued twice yearly in English and is the official record of proceedings, activities, and directory of members, committees and secretariat); Selecciones del Boletin de la IATA (yearly compendium of material from the IATA Bulletin, in Spanish); numerous booklets.

3. International Road Federation (IRF)

The IRF exchanges information and coordinates activities. It collects technical material from all sources on road construction and maintenance.

Publications.—World Highway Report (monthly, news bulleting on highway activities throughout the world, in English, French, and Spanish); Road International (quarterly); World Road Statistics (periodically); IRF Memorandum and Nouvelles de l'IRF (news bulletin); Annual report and various brochures; World Highway Directory (list of highway officials in 65 countries throughout the world); IRF Directory (list of members and officials of the Federation).

4. International Union of Railways (UIC)

The union has established in four different countries, offices or boards, that handle independently problems concerning currency compensations, research, and technical tests, information, publicity, and internal documentation.

Publications.—Bulletin of the International Union of Railways (monthly in English, French, and German); Summary of the Decisions of the UIC (in English, French, German); Bulletin de Documentation de l'UIC (monthly in English, French, Spanish); Yearly and Quarterly Statistical Bulletins (in English, French, German); International Distance Table; Analysis of Passenger and Baggage Tariffs; various books and studies.

5. International Council for Building Studies and Documentation (CIB)

The Council is composed of three sections on experimental research, research studies, and documentation. The documentation section took over the work of the former International Council for Building Documentation. The Council has achieved results on building documentation needs, exchange circuits of abstracts, codification of abstracts, international building terminology, standardization in the presentation of international building sheets, and Universal Decimal Classification.

Publications.—ABC. Abridged Building Classification for Architects, Builders, and Civil Engineers (in English but will be translated into other European languages); CIB Bulletin.

6. International Federation for Housing and Town Planning (IFHTP)

The Federation maintains a library and disseminates information. It has cooperated with UNESCO in making a study of bibliographic lacunae in housing and town planning.

Publications.—News Sheet (quarterly); An International Glossary of Technical Terms used in Housing and Town Planning (new edition, June 1951 in English, French, German, Italian, and Spanish); special pamphlets and bulletins.

7. International Union of Testing and Research Laboratories for Materials and Structures

The Union maintains an index of current research conducted in member laboratories. It cooperates in the exchange of publications and microfilmed documents. The Union is working on the publication of a multilingual dictionary on materials testing.

Publications.—Rilem Bulletin (8 issues a year in French and English); proceedings of symposia.

8. World Power Conference (WPC)

The Conference maintains a small working library, which is available for consultation only by prior arrangement.

Publications.—Statistical Year-books; Power Resources of the World Potential and Developed; Survey of the Present Organization of Standardization, National and International; annual reports; list of publications; transactions of conferences.

9. International Commission on Large Dams of the World Power Conference

The Commission provides for exchange of information between its various national committees; publishes proceedings, reports and other documents.

Publications.—Bulletin; International Technical Dictionary (in English, French and German published with UNESCO's financial support, the 2d edition is contemplated and will include Italian, Spanish, and Portuguese); reports of congresses.

10. International Commission on Illumination (CIE)

The Commission provides for the interchange of information between the member countries. It has established a vocabulary for the preparation and standardization of the terms and units making up the language of illuminating engineering,

the CIE system of color designation; and the standard sensitivity curve of a standard eye.

Publications.—International Vocabulary on Illumination (in French, English, and German, 1938); reports; codes; pamphlets.

11. International Gas Union (IGU)

The Union maintains a dictionary panel.

Publications.—Congress Proceedings; Gas and Industry Vocabulary (Multilingual).

12. Society of Industrial Chemistry

The Society maintains a library of chemical documentation. Microfilms and photocopies of documents are available.

Publications.—Chimie et Industrie; Chimie Analytique; Industrie de la Parfumerie; Produits Pharmaceutiques; Peintures, Pigments, Vernis; Travaux de Peinture; Industrie des Plastiques Modernes; Corrosion et Anticorrosion (all periodicals); reports on congresses.

13. International Institute of Welding (IIW)

The Institute among others has Commissions on (1) Documentation; (2) Terminology; and (3) Standardization.

Publications.—Bibliographical Bulletin for Welding and Allied Processes (quarterly composed of classified abstracts of welding literature from all parts of the world); Multi-Lingual Terminology for Welding and Allied Processes (in 10 languages divided into chapters dealing with different welding subjects; the chapters are being published separately). Collection of Reference Radiographs on Welds (a guide for the interpretation of radiographs).

14. International Container Bureau (ICB)

One of the aims of this Bureau is to centralize information useful for constructors, carriers and users of containers and handling devices. Also to disseminate research through publications, exhibitions and conferences. Archival data on all subjects connected with containers and their handling are maintained.

Publications.—Containers (semiannual) Reports; information leaflets; monographic pamphlets. All publications are in English and French.

REFERENCES

1. Yearbook of International Organizations, 1954–55.
2. Bibliographical Services Throughout the World, 1951–52, 1952–53.
3. International Activities in Librarianship, Bibliography and Documentation, July 1955, by Helen L. Brownson (National Science Foundation).
4. Bibliographical Services Throughout the World; First and Second Annual Reports (1951/52–1952/53); Fourth Annual Report (1954/55). Paris, UNESCO, 1955 and 1957.
5. UNESCO in Brief. Paris, UNESCO, 1956.
6. The United Nations and Promotion of the General Welfare. Washington, Brookings Institution, 1957.

Appendix II.—National Research Councils With Information Activities

COUNTRIES INCLUDED

Argentina	India	Philippines
Australia	Israel	Poland
Brazil	Italy	Spain
Canada	Japan	Sweden
Denmark	Netherlands	Union of South Africa
Egypt	New Zealand	United Kingdom
France	Norway	U. S. S. R
German Federal Republic	Pakistan	Yugoslavia

Note.—In some countries, such as Belgium, Finland, Iraq, and Venezuela, the national research councils (or centers) have no information services, but the latter are concentrated in national documentation centers, individual information centers, documentation societies, or major libraries.

In countries such as Iran, Mexico, and Switzerland, the information services of the national research councils consist only of subsidizing scientific publications.

In the Iron Curtain countries not included, such as Bulgaria, China, Czechoslovakia, Hungary, and Rumania, the information services of the national research centers closely resemble those of U. S. S. R. and Poland.

Argentina

The two central national organizations in Argentina are the National Council for Scientific and Technical Research and the National Board for Scientific and Technical Research.

The National Council was established in 1951 and acts as consulting agency to the National Board. It also maintains liaison between the Board and research institutes not under the jurisdiction of the Board.

The National Board is the executive agency. Its functions include guidance, support, and promotion of research, advice to Government on scientific policies, support of professional training, and information activities.

Information services.—Among the functions of the National Board for Scientific and Technical Research is the establishment of a National Documentation Center under the auspices of the Board. This center consists of 85 administrative units devoted to different documentation activities. The other information activities of the Board include direction and support of the publication of scientific papers, assistance in the organization of scientific congresses, and promotion of the exchange of scientific information with other countries.

References:

National Research Councils. UNESCO Document NS/122, March 31, 1955.

Consejo Nacional de Investigaciones Cientificas. Buenos Aires, 1957, 143 pp.

Australia

The Commonwealth of Australia Scientific and Industrial Research Organization was established in 1949 by the reorganization of the existing Council for Scientific and Industrial Research. Its functions include the initiation and carrying out of scientific research, the training of scientific research workers, the support of scientific research by grants, and the collection and dissemination of scientific and technical information. In addition, the CSIRO acts as means of liaison with other countries in matters of scientific research.

Information services.—In Australia, the trend is toward decentralized information services attached to active research centers. The CSIRO Information Service, which originally provided a central source of information in the fields covered by the organization, has been largely disbanded and each specialist division or section is now responsible for the information services in its respective field. The information services of these divisions vary from extensive documentation centers in the respective fields, to mere answering of inquiries by the staff of the respective division. The areas lying outside the subject field of the specialized division are covered by the CSIRO Secretariat.

Reference: Connell, Vera, ed. The Application of Results of Research; British Commonwealth Scientific Conference. New York, Academic Press, 1954, 212 pp.

Brazil

The National Research Council of Brazil was established in 1951. In addition to awarding grants and fellowships it has started several research programs and is establishing new research institutions.

Information services.—The establishment of a bibliographic and information center is being studied.

Reference: National Research Councils. UNESCO Document NS/122, March 31, 1955.

Canada

The Honorary Advisory Council for Scientific and Industrial Research was established in 1916 under a committee of the Privy Council. In the beginning its activities were mainly the planning and integration of research, organization of cooperative research, postgraduate training of research workers, and support of research by grants. Since 1924, however, research laboratories have been established under direct control of the present National Research Council of Canada.

Information services.—The headquarters of the Technical Information Service of the National Research Council of Canada are in the Council's laboratories at

Ottawa. The staff consists of 10 technically trained officers with a variety of qualifications and experience. In addition there are nine regional offices in strategic positions across the country, each in charge of a trained field officer. Inquiries may be addressed to the service directly or through the office of a field representative.

REFERENCES:

Connell, Vera, ed. The Application of Results of Research; British Commonwealth Scientific Conference. New York, Academic Press, 1954. 212 pp.
Organization of the National Research Council of Canada. Ottawa, 1952, 10 pp.

DENMARK

The Danish State General Research Foundation was established in 1952. Its functions consist mainly of sponsoring research. It has no research activities of its own.

Information services.—The foundation sponsors publication of scientific papers. (The Technical Scientific Research Council and Academy of Technical Sciences (one organization) does not report any specific information activities.)

REFERENCE: National Research Councils. UNESCO Document NS/122, March 31, 1955.

EGYPT

The National Research Council of Egypt was established by Royal decree in 1939, but did not receive its first budget until 1947, and was reorganized into its present form in 1953. Its functions are to "promote, stimulate, encourage, control, direct and coordinate scientific research of every kind, whether undertaken by public administration, scientific establishments, laboratories and other institutions, industrial enterprises, scientists, inventors or research workers, more particularly scientific research applied to agriculture, industry, and the national economy, public health and national defense." In addition, its functions include establishment of new laboratories, granting of scholarships, liaison and advisory functions, and establishment of documentation facilities.

Information services.—The National Research Council (or Center) has a Scientific and Technical Documentation Division, which acts as the scientific and technical documentation center for the country. This division was originally established in 1954 with the aid of UNESCO as the Scientific and Technical Documentation Center of Egypt, but was converted into a division of the National Research Council in 1957. It also publishes abstracts of scientific papers published in the Middle East.

REFERENCES:

National Research Councils. UNESCO Document NS/122, March 31, 1955.
Documentation Bulletin of the National Research Centre. Cairo, Vol. 3, No. 9–10, 1957.
"Scientific and Technical Documentation Division (Egypt)." UNESCO Bulletin for Libraries, Vol. 11, No. 7, July 1957, # 292.

FRANCE

The National Center for Scientific Research was established in 1948–49 after several previous amalgamations of several of the larger research organizations. Its main functions are to subsidize research and research facilities, to organize research in its own laboratories, to maintain a panel of research workers and a panel of technical assistants "ranging from workman-mechanic to highly qualified engineer, to assist research workers in laboratories not directly under CNRS." In addition, it provides some educational facilities, organizes scientific congresses, maintains a patent service and a documentation service.

Information services.—Most of the information services of the National Center for Scientific Research are concentrated in its Documentation Center. The services of the latter include photocopying, translation and international exchange of publications, a library, and publications of a bibliographic review, which covers some 130,000 articles from about 4,600 journals per year. The patent service and several other specialized services are also connected with this center. In addition the National Center for Scientific Research has several other specialized documentation centers, such as, for example, the Center of Cartographic and Geographic Documentation.

References:

National Research Councils. UNESCO Document NS/122, March 31, 1958.
Le Centre National de la Recherche Scientifique. Paris, La Documentation Francaise, July 15, 1952.
Secretariat d'Etat a l'Industrie et au Commerce. La Recherche Industrielle en France, Paris, Recherche Technique, 1956–1957.
Wyart, I. "Die Technische und Wissenschaftliche Dokumentation in Frankreich," Nachrichten für Dokumentation, No. 3, 1952, 133 pp.

German Federal Republic

In the German Federal Republic there are two main central organizations: One for basic research and the other for productivity. For basic research there is the German Research Association, and for productivity, the RKW (Rationalisierungskuratorium der Deutschen Wirtschaft), which includes also the German Productivity Center.

The German Emergency Scientific Research Association was founded in 1920. From 1930 to 1945 it was called the "German Research Association." In 1949 this association was reestablished and in 1951 it was amalgamated with the German Research Council, which had been founded in 1949, into the present German Research Association. (The old German Research Association was dissolved in 1951.) The functions of the new association are the formation of expert committees and working groups to study specific subjects to organize symposia and conferences, to subsidize research, to grant scholarships and fellowships, and to subsidize publication and acquisition of publications.

The RKW was founded in 1921 as the Reichskuratorium fur Wirtschaftlichkeit. It was a Government organization and existed until 1945. The new RKW was reestablished in 1950, and is basically a private organization. It consists of four departments: (1) Department I, which is engaged in the exchange of experience with all the technical organizations in Germany; (2) department II, which is the productivity center, with its main functions to promote international exchange of experience and to maintain an information service; (3) department III, which is responsible for publication, archives, and library; and (4) department Z, which is the administrative department of the organization.

Information services.—The information activities of the German Research Association are limited mainly to the subsidy of scientific publications (continuous support of 60 scientific journals) and the acquisition of publications by state, university, and research-institution libraries. It has a Publications Commission, consisting of 4 university professors and 3 editors, and a Library Commission, consisting of 8 university professors and 8 directors of state and university libraries. Under the Secretary General are a Section for the Acquisition of Foreign Literature, a Publications Section, and Coordination and Classification Section. However, other than a small reference library for the staff, the Research Association does not maintain an information service.

The RKW, apart from its archives and library, maintains an extensive Information Service which, under the motto of "Think before you move," answers some 50,000 questions per year at the cost of about DM50 per question. About 500 other information centers are at its disposal. It also acts as a clearinghouse for technical information in the German Federal Republic.

References:

National Research Councils. UNESCO Document NS/122, March 31, 1958.
Consejo Nacional de Investigaciones Cientificas, Buenos Aires, 1957, 43 pp.
Technical Information Services in Europe; Frankfort Conference. Paris, EPA, October 1955.
U. S. High Commission for Germany. Annual Report on Scientific and Industrial Research and Technological Advance, 1952. Bonn, HICOG, March 25, 1953.
Science, Vol. 127, January 3, 1958, pp. 22–23.

India

The Council of Scientific and Industrial Research was established by the Government of India as an autonomous nonofficial organization under the stress of wartime conditions in 1940. It is responsible for promoting scientific and industrial research in general and for coordinating activities in this area. The sponsoring of research is the responsibility of the Ministry of Education. However, in addition to sponsoring research in its own laboratories, the CSIR has

also financed several hundred research projects in various universities and other research institutes.

Information services.—One of the functions of the Council is the collection and dissemination of scientific information. Consequently, the Council has maintained an Intelligence Service for giving advice and information on technical subjects to private individuals, firms, Government departments, etc. With the establishment of the different laboratories, this service is being increasingly decentralized and inquiries on particular subjects are referred to the appropriate laboratories. The Central Intelligence Organization of the Council now deals only with inquiries of a general nature.

REFERENCES:

Connell, Vera, ed. The Application of Results of Research; British Commonwealth Scientific Conference. New York, Academic Press, 1954, 212 pp.
National Research Councils. UNESCO Document NS/122, March 31, 1955.

ISRAEL

The Research Council of Israel was formally constituted in 1949. Its main functions are to organize and coordinate research work, to advise the Government on scientific matters, to represent the scientific community of Israel on the international level and to provide scientific information services.

Information services.—Among the functions of the Council are the establishment and maintenance of a scientific information center or centers and the publication of scientific books, monographs, and periodicals.

REFERENCE:

National Research Councils. UNESCO Document NS/122, March 31, 1955.

ITALY

The National Research Council was established in 1923, and has been reorganized after World War II. Its functions include advice on scientific matters to the Government, establishment of scientific research institutions and sponsoring of research and study. It consists of national committees in seven major fields of science, a Commission on Education, scientific research centers and institutions, and a National Documentation Center and library.

Information services.—The very active National Documentation Center of Italy is under the auspices of the National Research Council. This Documentation Center receives about 30 percent of the total NRC budget, which is equivalent to about 3.2 million United States dollars.

REFERENCES:

National Research Councils. UNESCO Document NS/122, March 31, 1955
Consizlio Nazionale delle Ricerche. Organizzazione Generale del CNR nel 1957. Rome, 1957, 148 pp.

JAPAN

The Science Council of Japan was established in 1948 and began operation in 1949. It stems from the reorganization of the Imperial Academy, the National Research Council, and the Japan Society for the Promotion of Science. Its functions are to coordinate and promote research, to advise the Government on scientific matters, subsidies for research and governmental administrative and budgetary appropriations for scientific institutions and research laboratories, to promote international cooperation, and to foster the establishment of scientific organizations. It is mainly an advisory and representative organ and has no laboratories of its own.

Information services.—The information services of the Science Council of Japan are limited to publication of some scientific journals and reports, and to international relations.

REFERENCE:

National Research Councils. UNESCO Document NS/122, March 31, 1958.

NETHERLANDS

In the Netherlands there are two central national organizations: (1) The Netherlands Organization for Pure Research (ZWO); and (2) the Central National Council for Applied Scientific Research in the Netherlands. (TNO)

The Netherlands Organization for Pure Research (ZWO) started its activities in 1946 and was established by law in 1950. It has no laboratories of its own, but it sponsors research in universities and academic institutes, coordinates

research, particularly by awarding grants, and supports scientific training an publication.

The Central National Council for Applied Scientific Research in the Netherlands was established in 1932. It consists of several sectional councils in the major fields of applied science. The Central Council coordinates the work of the sectional councils and acts as the executive organ for those fields where no special organization exists.

Information services.—The information activities of the Netherlands Organization for Pure Research (ZWO) consist of subsidies for the publication and acquisition of scientific publications, subsidies for the acquisition of microfilms and photocopies. In addition, "ZWO has at its disposal a small stock of goods that can be loaned to research scientists, mainly typewriters, apparatus for reading microfilms, and sound films, photographic materials, camping gear and simple first-aid equipment."

The Central National Council for Applied Scientific Research has a library of about 5,000 books and 250 periodicals. It publishes a news bulletin and an illustrated popular scientific review.

References:

National Research Councils. UNESCO Document NS/122, March 31, 1955.
International Guide to European Sources of Technical Information. Paris, EPA–OEEC, 1957, 439 pp.
Higher Education and Research in the Netherlands; bulletin of the Netherlands Universities Foundation for International Cooperation, Vol. 1, No. 2, 1957, pp. 7–9.
Basic Report on Scientific Research in the Netherlands. The Hague, The American Embassy, July 30, 1956.

New Zealand

The Council of Scientific and Industrial Research (CSIR) was organized in 1926, and shortly afterward recommended the establishment of the Department of Scientific and Industrial Research (DSIR). The functions of the CSIR are primarily advisory, whereas the DSIR consists of 26 research sections and a scientific information center.

Information services.—The Information Service of the New Zealand DSIR is located at its headquarters. It brings to the notice of industrialists new developments and answers questions on a wide range of problems with direct recourse to the scientific staff available in the various branches of DSIR and other departments and university colleges. It publishes several research journals and information bulletins.

References:

Connell, Vera, ed. Application of Results of Research; British Commonwealth Scientific Conference. New York, Academic Press, 1954, 212 pp.
National Research Councils. UNESCO Document NS/122, March 21, 1955.
Republic Argentina. Direccion National de Investigaciones Cientificas y de Tecnicas. Los Consejos Nacionales de Investigacion Cientifica en el Extranjero. Buenos Aires, 1956, 131 pp.

Norway

In Norway there are two central organizations: (1) Norwegian Research Council for Science and the Humanities, and (2) Royal Norwegian Council for Scientific and Industrial Research.

The Norwegian Research Council for Science and Humanities was established in 1949. Its functions are to support research and establishment of new research institutions, to carry out research in its own laboratories, to award fellowships and to aid scientific publishing.

The Royal Norwegian Council for Scientific and Industrial Research was established in 1946. Its functions are to advise the Government on the direction and priority of technological research work, to place research contracts, to award research grants and to provide information services.

Information services.—The information activities of the Norwegian Research Council for Science and the Humanities are limited to sponsoring of scientific publications.

The Royal Norwegian Council for Scientific and Industrial Research has a committee on technical information services. It acts as information clearing center for scientific research and also supports scientific publication as the need arises.

REFERENCE: National Research Councils, UNESCO Document NS/122, March 31, 1958.

PAKISTAN

In 1949 the Government of Pakistan created the Department of Scientific and Industrial Research, which in turn decided to establish the Pakistan Council of Scientific and Industrial Research. The council has been established but is still in a state of development. Its functions are intended to be the initiation, promotion, and guidance of scientific and industrial research, establishment and administration of research laboratories, establishment of research societies, financial support of cooperative and individual research, liaison with research establishments of other countries and collection and dissemination of scientific information.

Information services.—Among the functions of the council is the establishing of a documentation center or centers and publication of scientific reports and periodicals.

REFERENCE: National Research Councils, UNESCO Document NS/122, March 31, 1955.

PHILIPPINES

The National Research Council of Philippines was created in 1933. It was closed during the Japanese occupation, and was reestablished in 1947. Its main functions are organization of research, advancement of specific lines of research, relations with other countries and support of research projects.

Information services.—One of the functions of the National Research Council of Philippines is to gather and collate scientific and technical information, cooperation with other governmental and other agencies. It also publishes information bulletins and other special reports as the need arises.

REFERENCE: National Research Councils, UNESCO Document NS/122, March 31, 1955.

POLAND

The Polish Academy of Sciences is the highest central scientific institution in the country. It was created in 1951 and carries out scientific work directly in the many research centers attached to the academy. It also plans, organizes, and coordinates research throughout the country. This work is done by the numerous scientific committees, made up of the leading specialists in the respective disciplines, which lay down the general directives for the fulfillment of the most urgent tasks.

The technical research is directed by the Central Government Planning Commission, and is carried out in the numerous technical institutions and enterprises under the respective industrial ministries.

Information service.—A scientific documentation center is attached to the Polish Academy of Science. It prepares abstracts from world literature and renders special information services to scientific institutions and research workers. It publishes the Quarterly Review of Publications which is an annotated bibliography in English of the publications of the Polish Academy of Sciences and of the Polish scientific societies. There is also a distribution center for scientific publications.

Under the Central Government Planning Commission there is the Central Institute of Scientific and Technical Documentation. During the planning stages of the national economy of Communist Poland it was agreed to adopt the Russian idea of centralized exploitation of the world's literature for economic purposes. But eventually the pattern of the British DSIR decentralized system was found more suitable to the needs of Poland. Thus the final arrangement of the documentation for industry in Poland consists of three levels: (1) The Central Institute, which was established in 1950 and directs the total activity of industrial documentation of Poland, gives systematic instructions to the branch centers, does research in the field of documentation and provides training facilities in technical information work in all branches of industry. It publishes the Polish Technical Abstracts in Polish and English (in the same issue) of all technical publications appearing in Poland. It also provides on request photocopies, microfilms, and translations (into Russian, English, French, and German) of all the documents in the Polish Technical Abstracts. It has a staff of about 200. (2) The second level consists of some 82 branch centers of scientific and technical documentation for particular industries. The whole of scientific and technical literature of the world is abstracted in these individual documentation centers, according to their various subject fields. The abstracting is done by specialists employed in the respective industries. (3) The third level consists of small documentation units, of which

there are about 600. The main function of these plant-level centers is to render information services in the field of the respective enterprise.

REFERENCES:

Suchodolski, Bogdan and Olszewski, Eugeniusz. The Development of Polish Science (1945–1955). Warsaw, Polonia Publishing House, 1956, 91 pp.
Polish Technical Abstracts, No. 2, 1956.
NSF. Unpublished British Report on a Visit to Poland, 1957.
Polish Academy of Sciences. Quarterly Review of Publications, No. 2, 1957.

SPAIN

The Higher Council for Scientific Research was established in 1939. The council is comprised of 8 institutions comprising 147 research bodies. Among the members of the council there are also specialists from libraries and archives. The main functions of the council are to conduct research in its constituting institutions and to award grants and fellowships for studies abroad. "Care was taken from the beginning to insure that this centralization should in no way hamper the freedom and initiative of scientists."

Information services.—The council publishes 152 periodicals in all fields of science and the humanities. During its existence the council has awarded 18 grants for research in the geographical bibliographic and documentation sciences.

REFERENCES:

National Research Councils, UNESCO Document NS/122, March 31, 1955.
Becarios del Consejo Superior de Investigaciones Cientificas, Madrid, 1957.

SWEDEN

The two research councils in Sweden are: (1) The Swedish Natural Science Research Council and (2) The State Council of Technical Research.

The Swedish Natural Science Research Council was established in 1946. It consists of a president appointed by the Government and eight other members appointed and elected from the main scientific research institutions of the country. Its budget is 1 million Swedish crowns plus 300,000 Swedish crowns for publication of research results. Its main functions are to assign grants to institutions and individuals for scientific research and to coordinate research work. The council is closely related to the Swedish Atomic Energy Commission.

The State Council of Technical Research was founded in 1942. It consists of 8 persons appointed by the King for 3 years from the main technical research institutions of Sweden, including the Royal Swedish Academy of Engineering Science. The administrative work is carried out by a secretary, assistant secretary (part time) and a clerical staff of four. The functions of the council are to advise the Government on questions related to technical research, to survey the technical sciences as to where research is needed and to issue grants and scholarships.

Information services.—The information services of the Swedish Natural Science Research Council are limited to subsidizing the publication of research results. Except for its yearbook, the council has no publications of its own, but it subsidizes 25 others regularly.

The State Council of Technical Research has no information services of its own, but the Royal Swedish Academy of Engineering Science, which is represented on the council, maintains an extensive technical information service. This service, known as the IVA Information Service, was established in the last year of World War II. It has a library of about 12,000 volumes and subscribes to about 300 current journals. The IVA Information Service is the Swedish center for the OEEC (Organization for European Economic Cooperation) Documents Exchange. It is also a measurements technique information center for Europe, participates in the Questions and Answer Service of the Office of Technical Services, United States Department of Commerce, and maintains the so-called contact service with the researchers' contact organization. The latter consists of some 500 contact men in industrial enterprises and research institutions and of a secretariat at the information service. Each contact man has a double mission: to transmit within his circle, institution, enterprise, etc., the information he receives from the secretariat, and to supply the secretariat with the information obtained from his "surroundings." A small group of "Scandinavian contact men" are stationed in other Scandinavian countries and receive and deliver information on to and from the researchers' contact organization.

The IVA Information Service handles about 17,000 loans of publications per year and publishes the Acta Polytechnica. Over 400 industrial concerns collaborate with the IVA Information Service.

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UNION OF SOUTH AFRICA

The Council for Scientific and Industrial Research, established in 1945, is the national advisory body to the Government on all matters affecting scientific and industrial research. It is responsible for exploring and developing research, with some emphasis on medicine, for support of postgraduate training and research, and it operates a number of its own research laboratories.

Information Services.—Since its organization the CSIR has maintained a library and information division, which, in addition to supplying published information to industry, advises on the organization and use of small libraries. It also maintains informational liaison with its own research laboratories as well as other countries.

REFERENCE: Connell, Vera, ed. The Application of Results of Research; British Commonwealth Scientific Conference. New York, Academic Press, 1954, 212 pp.

UNITED KINGDOM

The Department of Scientific and Industrial Research (DSIR) was established in 1916 to promote and organize scientific research with a view to its application in trade and industry. This is done partly by grants to research associations and partly by establishing research stations under the direct control of DSIR.

Information services.—It is the policy of the DSIR that information services to industry should be operated as far as possible in a decentralized and specialized manner by units in the various stations or research associations where active scientific work is in progress. Nevertheless, the Intelligence Division at DSIR headquarters maintains a central information service linked to these special units Its services include the following:

1. To direct inquiries, where necessary, to the best sources of scientific and technical information.
2. To prepare and distribute guides to the sources of information.
3. To provide answers to miscellaneous technical inquiries.
4. To cooperate closely with local services.
5. To encourage the development of specialized technical services and close cooperation between them.
6. To undertake research on methods of disseminating information and on use of existing services and documentation techniques.
7. To give publicity to the existence of the present information services so that they may be used to an optimum extent.

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U. S. S. R.

In the U. S. S. R. all decisions, including those on scientific and technical research, are made by the Council of Ministers of the U. S. S. R.

The scientific research is centered around the Academy of Sciences of the

U. S. S. R., and the technical research under the various respective Ministries with the Government Planning Commission as the central administrative and policy organ.

The Academy of Sciences was founded by Peter the Great in 1725, reorganized in 1918 according to Lenin's specifications, and its present constitution was adopted in 1930. This constitution outlines the role of the academy as follows:

"(1) The academy of Sciences of the U. S. S. R. is the highest research institution in the U. S. S. R., which incorporates the greatest scientists of the country. The Academy is directly subordinate to the Council of Ministers of the U. S. S. R., to which it reports about its activities annually.

"(2) The main task of the Academy of Sciences is the general overall coordination of all the theoretical as well as applied sciences in the U. S. S. R., and the study and development of the world's scientific thought. At the basis of its activity the academy shall place the purposeful utilization of scientific achievements for the building of the new socialistic classless society.

"(3) In order to accomplish this basic task, the academy will—

"(*a*) concentrate its work on the most acute current problems in all fields of science;

"(*b*) study the natural resources and the productive forces of the country, as well as the cultural and economic achievements of humanity, and will promote their timely and rational utilization;

"(*c*) promote the raising of qualifications of scientific workers in the U. S. S. R.;

"(*d*) provide expert advice to the highest administrative organs of the U. S. S. R."

The academy has over 125 research institutes. It also has extensive graduate research facilities, and its total research and technical staff is about 35,000, among which there are 151 academicians and 325 corresponding members. The academy's budget is about 1 billion rubles per year.

For medical and agricultural research there are the Academy of Medical Sciences, which was established in 1944, and the All-Union Academy of Agricultural Sciences, respectively.

The technical research is carried out in the over 1,000 technical research institutes under the respective ministries.

Information services.—The information services of the Academy of Sciences of the U. S. S. R. consist of the All-Union Institute of Scientific and Technical Information, the main Library of the Academy of Sciences and the libraries of the Academy's research institutes.

The All-Union Institute of Scientific Information was established in 1952 as the Institute of Scientific Information and reorganized in 1956 to devote some of its activities to technical information as well. The Institute prepares abstracts (abstract journals in 13 subject fields), prepares translations and/or photocopies of papers abstracted upon request, issues an express series of Russian-language excerpts from the most important foreign scientific journals, and does research on machine processing of information.

The Library of the Academy of Sciences of the U. S. S. R. is the former Royal Library, which was transferred to the Academy when the latter was founded. It issues an information bulletin on foreign scientific publications, prepares translations upon request, and maintains an international exchange service of the Academy's publications. The Academy's research institute libraries service mainly the respective institutes.

The information activities of the Academy of Medical Sciences consisted mainly of publishing an abstract journal in the medical sciences. Very recently, however, the establishment of an Institute of Medical Information, similar to the All-Union Institute for Scientific and Technical Information, has been announced.

The All-Union Academy of Agricultural Sciences has an extensive library, which is reputed to be the second largest agricultural library in the world. It publishes an extensive agricultural bibliography, Agricultural Literature in the U. S. S. R., which includes also some satellite and foreign literature. It also maintains an international exchange service of agricultural literature.

The technical information services are centered in the central technical information institutes of the various respective ministries. While these institutes themselves concentrate mainly on the publication of information bulletins primarily on foreign scientific and technical publications, they coordinate the work of the libraries and information centers in individual enterprises. These libraries and centers in turn prepare abstracts, translations, and publications, and render information services in the respective specialized subject fields.

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YUGOSLAVIA

The Council of Academies of the Yugoslav People's Federal Republic was established in 1948. The main purposes of the council are: (1) to coordinate the activities of the Serbian Academy of Sciences, the Yugoslav Academy of Sciences and Arts, the Slavene Academy of Sciences and Arts, and such other academies as may be founded; (2) to follow the scientific activities of all the scientific institutions of the country; (3) to advise the Government on scientific problems and (4) to represent Yugoslav science as a whole. Its functions also include the organization of conferences, and grants to research workers to study and attend conferences abroad.

Information services.—The council publishes a quarterly scientific bulletin with the purpose of informing the public abroad about scientific activities in Yugoslavia.

REFERENCE: National Research Councils, UNESCO Document NS/122, March 31, 1955.

APPENDIX III.—NATIONAL DOCUMENTATION CENTERS

COUNTRIES INCLUDED

Argentina	German Democratic Republic	Sweden
Austria	German Federal Republic	Switzerland
Belgium	India	Turkey
Brazil	Italy	Union of South Africa
Czechoslovakia	Japan	United Kingdom
Denmark	Mexico	U. S. S. R.
Egypt	Netherlands	Uruguay
France	Portugal	Yugoslavia

ARGENTINA

The National Documentation Center of Argentina is under the auspices of the National Board of Scientific and Technical Research. (Described in appendix II.)

AUSTRIA

The central documentation organization in Austria is the Documentation Center for Technology and Economy. The Austrian Society for Documentation and Bibliography is attached to this center. The functions of the center as well as the society are the collection, organization, and international exchange of scientific and technical information. Both are operational rather than coordinating organizations and provide also information, bibliographic, photoduplication, and translation services.

BELGIUM

In Belgium there are two central documentation organizations, although all the scientific and technical information services are by no means centralized. (1) The Belgian Documentation Association cooperates closely with the library section of the Association of the Preservers of Archives of the Libraries and Museums in Belgium, with the Belgian Commission of Bibliography, and with the Belgian

Institute of Standardization. One of the most important functions of the Belgian Documentation Association is to promote and develop the education of information and documentation specialists. (2) The International Office of Bibliography is located in Brussels and acts also as the bibliographic center of Belgium. Its main function is to establish a bibliographic catalog in all fields of science and technology. It performs its own bibliographic functions and cataloging, and at present has holdings of about 17 million documents.

Brazil

The establishment of a bibliographic and information center is being studied. (See appendix II.)

Czechoslovakia

The central documentation organization in Czechoslovakia is the Technical Documentation Center of Czechoslovakia. One of the main functions of this center is the preparation and publication of abstracts in science and technology. The approximately 30,000 abstracts prepared annually are published in 5 series of abstract journals. The other functions of the center include research of technical literature, microfilm service, maintenance of an archive of literature on industrial enterprises, and a translation service. Branch documentation centers have been established at most of the large industrial enterprises as well as research institutes.

Denmark

The central documentation organization in Denmark is the Danish Center for Documentation. It is located in the Technical Library of Denmark, and its functions are: Encouragement and curricular supervision of the education of information and documentation personnel, as well as special and advanced education of the latter; actual documentation in the fields of science and technology; classification of the most important papers from the world's scientific and technical publications; organization of libraries in individual enterprises; and publication of the Index for Industry and special Classes of the Universal Decimal Classification. It also has various classification committees, and provides a photoduplication service. The center acts as the main liaison—domestic and foreign—center of the country, but the more extensive special information services are decentralized. The network of such individual services is being expanded.

Egypt

The National Documentation Center of Egypt, established with the aid of UNESCO, has been reorganized into the Scientific and Technical Documentation Division of the National Research Council, but as such still remains the documentation center of the country. (Described in appendix II.)

France

The two documentation centers in France are: (1) The French Union of Documentation Organizations, and (2) the Documentation Center of the National Center for Scientific Research. The documentation itself, however, is not centralized.

The French Union of Documentation Organizations has established the National Institute of Documentation Techniques, which does research in documentation and also gives higher courses on pertinent subjects. The union itself offers intermediate courses in documentation. The union publishes the ABCD (Archives, Bibliotheques, Collections, Documentation) in cooperation with the Professional Association of French Archivists, the French Library Association, and the General Association of the Preservers of Publication Collections of France. It also publishes the Bulletin of Bibliographic Documentation and the Bulletin of the French Union of Documentation Organizations.

(The Documentation Center of the National Center for Scientific Research is described in appendix II.)

German Democratic Republic

The documentation activities in the German Democratic Republic lean toward the general organizational pattern of documentation in the Communist bloc countries. Thus its documentation center is the Center of Scientific Literature. It is responsible for the establishment, development, organization, and direction

of documentation. Its main functions are policy decisions, as well as supervisory and coordinating activities. It also prepares and publishes abstracts on cards and in several professional journals in a number of specialized subject fields, prepares reviews and bibliographies, provides photoduplication and translation services, and has a section for the education of information and documentation personnel. It also closely observes the education of such personnel in other appropriate institutions. In addition it publishes a documentation journal with abstracts, Dokumentation.

German Federal Republic

The main center for documentation in the German Federal Republic is the German Documentation Society, which is an active coordinating organization with a number of its own documentation activities in the various special sections. Among its main functions is research on documentation techniques and education, or rather the development of the curricula for the latter, of special information and documentation personnel. It is also active in the standardization of various documentation procedures and "tools" design of special classification systems and development of specialized services, as well as international exchange of information. It publishes the Documentation News with abstracts, and favors well coordinated but greatly decentralized services.

India

The Indian National Scientific Documentation Center was established in 1951 under the sponsorship of UNESCO. The functions of this center are (1) to receive and retain all scientific periodicals required in India, particularly those required by the universities, scientific research organizations and Government laboratories; (2) to supply photocopies and translations of articles required by laboratories or individual workers; (3) to meet demands for abstracts as far as possible; (4) to prepare an index of the journals available and the journals required for various subjects; (5) to answer inquiries from information available in the center; (6) to be an national repository for reports of the scientific work of the nation, both published and unpublished; (7) to be a channel through which the scientific work of India and the surrounding countries is made known and made available to the rest of the world.

In addition, it cooperates with the Central Water and Power Commission and the Indian Standards Institution, in establishing classification scheme and documentation in these fields.

The center is now under the general auspices of the Council of Scientific and Industrial Research.

Italy

The National Center for Scientific and Technical Documentation of the National Research Council is the central documentation organization in Italy. (Described in appendix II.)

Japan

The Japan Information Center of Science and Technology (JICST) was established in November 1957. Although Japan has had a number of documentation centers in various fields of science technology, this is their first attempt to coordinate and/or centralize some of the information activities in the country. This center is supported both by the Government and by private funds. Its budget for the first year is as follows:

Investment:		
Government	¥40,000,000	(U. S. $111,111)
Civil	40,000,000	(U. S. $111,111)
Budget for the fiscal year 1957 (August 1957–March 1958):		
Government subsidy	30,000,000	(U. S. $83,333)
Endowment	30,000,000	(U. S. $83,333)
Revenue	5,000,000	(U. S. $13,888)
Total	65,000,000	(U. S. $180,555)

The center consists of an Administrative, an Information, an Investigation, and a Planning Section, as well as a library. Its functions are outlined as follows: (1) Collecting foreign (1,500 in 1958, 5,000 in 1959) and domestic (1,500) period-

icals, and other materials in science and technology; (2) classifying, processing, and storing the materials, i. e. (*a*) abstracting and indexing articles, (*b*) recording, encoding, and retrieving the materials with mechanical or electronic devices, (*c*) storing the materials in microfilm form; (3) supplying information, i. e., (*a*) publishing abstracts or indexes in card or book form, (*b*) compiling bibliographies and answering questions in science and technology on request, (*c*) reproducing, and translating individual articles on request; (4) organizing domestic information services and cooperating with foreign documentation centers.

Mexico

The Center of Scientific and Technical Documentation of Mexico was established in 1950 under the sponsorship of UNESCO. It is to serve in the interests of all the Latin American countries. It publishes a bibliographic bulletin, which includes abstracts, annotations, and reviews from over 2,000 scientific and technical publications. In the center there is a Section for Bibliography, a Translations Service (into Spanish) and a Documents Analysis Section. The center also offers language courses in German, English, and French and provides photoduplication and information services.

Netherlands

The Netherlands center for documentation, the Netherlands Institute for Documentation and Filing, is the outgrowth of the first society in the world whose name included the word "documentation," and which was founded in 1920. The center consists of five sections besides the Administrative Bureau and the Secretariat. The sections are (1) the Information Service, (2) the Library and Publications Section, (3) the Technical Information and Documents Section, (4) the Photoduplication Section, and (5) the Advisory Section on Card Catalogs and Indexing. The official organ of the center is the Journal for Efficiency in Documentation.

Portugal

The Portugese Center of Scientific Documentation at the Institute of High Culture of the National Ministry of Education consists of the following departments: (*a*) Inventory Service and the Portugese Scientific Library, (*b*) Portugese Scientific Bibliography Service, (*c*) Service of Bibliographic Orientation, (*d*) Publication and Distribution Service (*e*) Microfilm and Photoduplication Service, (*f*) National and International Exchange Service.

Even though the documentation services are centralized, there is a tendency to decentralize and expand the network of specialized services.

In addition to this center there is also a Portugese Documentation Association, which offers courses in documentation since 1953, and several other sizable documentation centers at research institutes and laboratories.

Sweden

In Sweden there is no central documentation center, but documentation problems are taken up at the technical literature society, which is constituted of documentalists, industrial librarians, and employees of technical libraries. It offers short courses in documentation, and devotes some attention to the procedures of establishing new documentation facilities.

Switzerland

In Switzerland there is very close cooperation between documentalists and librarians. The Swiss Association for Documentation acts as the coordinating and information-about-information center. The largest scientific and technical libraries in Switzerland in turn act as national depositories and information centers.

Turkey

In Turkey the Institute of Bibliography of the Turkish National Library has the functions of a national documentation center. It prepares special bibliographies and various other scientific and technical reference publications. It provides also photoduplication and translation services, and acts as the national as well as international exchange center.

Union of South Africa

In the Union of South Africa there are two committees: (1) the South African National Documentation Committee and (2) the South African Library Association Bibliographical Subcommittee. These committees encourage and further the documentation activities in the country, primarily through the South African Public Library and the Information Division of the South African Council for Scientific and Industrial Research, where both act as clearinghouses for scientific and technical publications and information.

U. S. S. R.

There is no central documentation center in the U. S. S. R. "The word 'documentation'," say the Soviets "is widely used in the capitalistic countries, but has failed to take hold in the Soviet Union." "And naturally so," they continue, "for what is designated by 'documentation' by the capitalists, is nothing but ordinary library and information activities."

However, apart from the All-Union Institute of Scientific and Technical Information of the Academy of Sciences of the U. S. S. R. and the Central Information Institutes of the Industrial Ministries three other central services may be mentioned as special-purpose national documentation centers:

1. The All-Union Book Chamber (Vsesoiuznaia Knizhnaia Palata).
2. The International Book Chamber (Mezhduharodnaia Kniga).
3. The State Scientific Library of the Ministry of Higher Education.

The All-Union Book Chamber is the cataloging center for the entire Soviet Union. It publishes a regular index of all periodical articles published in the Soviet Union (Letopis' Zhurnal'nykh Statei) and similar indexes for books and other publications. It also publishes some 112,000 cards in 94 million copies on all new publications.

The International Book Chamber is the central agency for foreign subscriptions and purchases as well as any other export-import problems in connection with publications. It also publishes annotated catalogs in non-Russian languages of books and periodicals available for priced export and foreign subscription.

The State Scientific Library of the Ministry of Higher Education is one of the largest libraries in the U. S. S. R. It attempts to acquire all Soviet and most of the foreign publications in science and technology. Before the establishment of the All-Union Institute of Science and Technology this library prepared most of the Soviet scientific and technical abstracts. It has still retained some limited abstracting services, prepares numerous special bibliographies and has an extensive translation service, including the publication of the Index of Translations of Foreign Professional Literature.

United Kingdom

There is no centralized documentation center, but the central coordinating body is the ASLIB—Association of Special Libraries and Information Bureau. It encourages documentation activities all over the United Kingdom and publishes two notable information journals: the Journal of Documentation and the ASLIB Proceedings.

Uruguay

In Uruguay documentation services are centralized in the Center of Scientific, Technical, and Economic Documentation, which is located in the National Library. It provides special documentation services in mathematics, physics, chemistry, medicine, pharmacy, astronomy, geology, agriculture, civil engineering, and economics. It also provides a special documentation service.

Yugoslavia

In Yugoslavia there is the Yugoslav Center of Technical and Scientific Documentation, which is located in Belgrade and has sections in other parts of the country. Its information services as well as a wider documentation network are being developed with the aid of UNESCO. The center will eventually be equipped with modern documentation facilities.

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Appendix IV

The Programs of Unesco

J. E. Holmstrom

UNESCO—the United Nations Educational Scientific and Cultural Organization—is one of the family of eight "Specialized Agencies" affiliated to the United Nations, its particular task being to promote international peace by creating a pool and promoting exchanges of knowledge and experience in matters of education, science and culture.

The projects whereby it pursues this aim are agreed upon, and the funds for doing so are voted, by the General Conference of Unesco at its meetings every two years. At these meetings all the 74 Member States are represented as well as numerous international non-governmental organizations which have what is called "consultative status," the right to propose items for inclusion in the Agenda. Projects decided upon are given effect through five "program departments" staffed by specialist staff members of the Secretariat in Paris. These are respectively the Departments of Education, of Natural Sciences, of Social Sciences; of Cultural Activities and of Mass Communication. In addition there is a Department of Technical Assistance whose activities are financed by the Technical Assistance Board of the United Nations independently of Unesco's own budget. They consist mainly of sending missions of experts to advise on improvements in the less developed countries of the world, at the request of the Governments concerned, and in arranging Fellowships for nationals from those countries to receiving training in techniques developed in other countries.

Projects of kinds which would interest the present Conference—such things as the servicing of international advisory committees, the organizing of congresses and symposia, the compiling and publishing of reports and bibliographies—are undertaken in varying degrees by all of the program departments. Sometimes this work is done by staff members of the Secretariat directly either in Paris or attached to the Science Cooperation Offices of Unesco which exist at four centers in different parts of the world. More often it is carried out indirectly, by giving subventions or ad hoc contracts to international non-governmental organizations such as, for instance, the International Federation for Documentation, the International Organization for Standardization, the International Council of Scientific Unions, the Council for International Organizations of Medical Sciences, the Union of International Engineering Organizations and others in different fields. In fact, Unesco prefers, as a matter of principle, to act through bodies such as these rather than to do the executive work itself; it has itself helped to

found quite a number of them and it helps them financially and otherwise until they are able to stand on their own feet.

The Department of Cultural Activities has among its sub-divisions a Libraries Division which is responsible among other things for publishing the bi-monthly *Unesco Bulletin for Libraries*, and also for servicing the International Advisory Committee on Bibliography. This Committee through its secretariat coordinates the policy of all the Departments of Unesco in regard to questions that fall within its scope. It is concerned with matters which are of general interest, and practices which are of general applicability, in all branches of human enquiry, but continuous liaison is maintained with other program departments in the Secretariat which administer separate advisory committees for documentation, and also for terminology and lexicography, from the special points of view required by the interests of particular disciplines. This applies for instance to the Department of Natural Sciences and the remainder of this chapter will be devoted to mentioning some of the projects in documentation, terminology and lexicography which are the responsibility of that Department.

Shortly after the beginning of Unesco in 1946, a committee was set up jointly with the World Health Organization (another of the United Nations family of Specialized Agencies) having the rather long name of *Co-ordinating Committee for Indexing and Abstracting in the Medical and Biological Sciences.* This Committee published in 1951 a report on its activities, providing a survey of the situation with which it was concerned; a report which is still available and is of considerable interest. It was responsible also for bringing out, under the title *World Medical Periodicals*, a list of about 4,000 of these, giving both their full and their correctly abbreviated titles, their places of publication and symbols to show which of the primary journals are covered by which of the main medical abstracting services. Lists of this kind are of practical value in all subject fields. Among other purposes, they can serve as a basis for local action in compiling union catalogues which will indicate which of the research libraries in a particular country or region hold sets of the periodicals that are not everywhere available. Where union catalogues already exist (as for instance in Belgium) it is possible also to proceed in the reverse direction by extracting from them the particulars of those periodicals which relate to a particular field of science and integrating them to make an international list. In fields besides medicine, Unesco intends to encourage the use of both these methods for compiling up to date lists of scientific periodicals, either itself or through appropriate specialist organizations.

Its interest in medical documentation continues but the Committee previously mentioned no longer exists. This has been replaced by the inclusion of two medical members on another committee which in order to describe the full range of its interests has an even longer name: *the International Advisory Committee for Documentation and Terminology of Pure and Applied Science.* This Committee, administered by the Department of Natural Sciences, exists in its present reorganized form since 1954. It has inherited the responsibilities of a provisional committee which was formed to advise the Director-General on giving effect to the recommendations made by the International Conference on Science Abstracting which Unesco organized in 1949. That was a conference of major importance, and it can be claimed that its recommendations which are embodied in the Final Act appended to its report published two years later have led directly and indirectly to useful improvements in those services which aim to provide the scientist with current awareness of new literature that may be useful to him.

Provision of "current awareness" is one half of the problem. Now it is being suggested that Unesco should organize a similar conference, on the same scale, relating to the other half, that of "retrospective searching" of references to the literature which has already appeared; the problem of enabling the scientist to retrieve, from among the total mass of millions upon millions of documents piled up in the world's libraries, those particular items which are potentially of greatest value in any particular enquiry. Such a conference would have to consider and compare the merits and limitations of all known and prospective methods for doing this, whether by alphabetical indexing, by the use of a methodical classification or by automatic selection of encoded references. In regard to these new techniques Unesco is already cooperating with the International Federation for Documentation (FID) which has a committee on the subject—FID/S, Mechanical selection—a committee which is anxious to collect particulars of coding systems already in use for different subject fields.

For budgetary reasons the proposed new conference, not yet decided upon, could not in any case be arranged until 1959. If it does take place, the results of

whatever other conferences may meanwhile have been held by other bodies, national or international, will of course be utilized to the utmost, so that the Unesco conference may have the advantage of taking off from a more advanced starting point.

It may be of interest to mention here some of the publications and activities that have been influenced by the 1949 conference in addition to its own report. In preparation for it the late Dr. W. W. Varossieau had carried out a very interesting international survey of the existing abstracting services, analyzing these statistically from different points of view, which was printed by the International Federation for Documentation at Unesco expense.

For purposes of reference, enabling one to find out what abstracting or bibliographical bulletins are anywhere available that cover any desired subject field either comprehensively or selectively, Unesco and the FID have jointly published the *Index Bibliographicus.* This is sub-titled "Directory of current periodical abstracts and bibliographies"; it is world-wide in scope, classified in arrangement and fully indexed. Volume 1 covers science and technology; Volume 2 the social sciences, education and humanistic studies. A new edition is scheduled to appear in 1956.

Among other questions debated at the 1949 conference was the longstanding one of "authors synopses" appearing along with the original articles in periodicals. There are those who say that such synopses are not suitable for reprinting as separate abstracts; but the consensus of opinion was that with proper editorial control they might be made so, or at any rate might be made to save subsequent independent abstractors much time and trouble. Believing this, Unesco has printed thousands of copies, in four languages, of a double-sided sheet entitled Guide for the Preparation and Publication of Synopses, which is being distributed as widely as possible among all those who may be able to help in propagating the principle described. Copies are available free on request. The fact of abstracts being provided ready made at the same time as the original articles does not prevent independent abstractors afterwards making their own in cases where this may be desirable from special points of view. It is surely more rational than the indirect and haphazard way that most abstracting has hitherto been done, whereby every month hundreds of thousands of scientific articles are scattered over the world and it is not until months later that the various abstracting services catch these more or less efficiently in their nets.

An even more important step towards rationalization of abstracting which Unesco took, by performing its habitual function as a catalyst between the parties concerned, was to bring about the formation of the International Council of Scientific Unions (ICSU) Abstracting Board. This is an autonomous body affiliated to the ICSU and like the latter is helped financially by Unesco. It is a kind of club which existing abstract journals can join for purposes of coordination and mutual assistance both between one another and between them and the primary publishing journals. It began by linking the British *Physical Abstracts,* the French *Bulletin Analytique* (now *Bulletin Signaletique*) and the German *Physikalische Berichte,* and is now gradually being extended to take in other fields of science also. What saves many weeks of delay is that the participating abstract journals receive page proofs of articles in advance of these being actually printed in the original journals. Certain Russian periodical publications are included.

Further, the 1949 conference took up the question of terminology and nomenclature. It recommended that steps should be taken to improve the adequacy of the supply of multilingual technical dictionaries for all fields of science and technology. This has led to a series of activities which engage about half of the time and resources under the section of the Unesco program in the Department of Natural Sciences which is here being discussed. An initial report on the problem, now out of print in English, was written six years ago. An obvious first step was to find out what special dictionaries already existed, so the report had appended to it a bibliography. Later this was expanded and published separately under the title *Bibliography of Interlingual Scientific and Technical Dictionaries.* The third edition, which appeared in 1953, lists no less than 1,629 such works, classified under 237 subject heads and indexed in 75 languages. This large total may seem to belie the statement that the provision of such dictionaries is inadequate; but it should be noted at once that a large proportion of them are marked as out of print, and that those which are in fact available vary so much in modernity, quality, mode of arrangement and convenience of use, as also in their completeness of coverage of different subject fields of languages, that there can be no doubt of the urgent need that exists for the problem to be systematically tackled. This is

especially true of the less common languages, and of oriental languages, which are provided with hardly any dictionaries for the more specialized subjects.

Much attention has been given to the best ways of remedying this state of affairs and of linking the preparation of dictionaries with the movement towards standardization of terminology on the basis of agreed definitions. For this latter purpose Unesco cooperates with the International Organization for Standardization which has a committee ISO/TC37 concerned with principles and coordination of terminology. In 1955 Unesco published Volume 1 of a *Bibliography of Monolingual Scientific and Technical Glossaries* listing national standards of technical terms. This is to be followed by Volume 2, listing glossaries which contain definitions from miscellaneous sources.

Unesco supports this work of standardization but takes the view that it is not the whole answer, for, in the nature of things, science continues to expand and to evolve new concepts for which new descriptive terms are needed, more quickly than standardized definitions of their meanings can be agreed upon. In the meantime the need for special dictionaries is a matter of such urgent international importance that means must be found to encourage the production of dictionaries recording standardized terms wherever available, but also recording terms whose meanings, for the time being, are governed simply by the force of custom. The two classes of terms, standardized and not, ought to be distinguished typographically or by symbols, and it is to be hoped that in successive editions the proportion of standardized terms may increase.

What, therefore, is envisaged in the Unesco program relating to this is the development and propagation of certain principles which can be recommended for observance by international organizations concerned in producing dictionaries for their respective fields. About twenty international federations of national societies concerned with different branches of engineering exist which in turn are federated in the Union of International Engineering Organizations (more often known under its French name, Union des Associations techniques internationales). Many of these are engaged in constructing multilingual dictionaries of the technical terms relating to their own subjects, and have requested advice from Unesco in doing so. In some cases they are also given financial assistance, but the funds available for the purpose are very limited. The same applies to a number of organizations for other branches of science. In responding to these requests, Unesco takes the opportunity to propagate the principles of technical lexicography it has developed. In this way it is hoped to insure that the development shall proceed on uniform lines, without unnecessary overlapping, so as progressively to build up a kind of mosaic of dictionaries covering all subject fields and all necessary languages.

As an example of how this works, the International Institute of Welding has set up a committee of experts from its member societies in different countries, who are cooperating to produce special dictionaries containing the equivalents of welding terms in 12 languages. The work is coming out in separate parts, relating to different kinds of welding. A comparison between the earlier and later issues shows conspicuous improvements in presentation and other details, reflecting the advice given that Institute by Unesco.

The people who are most often confronted with terminological puzzles are technical translators. Most of them maintain some sort of record of the problems of this kind they have had to solve in the course of their work, often by way of considerable research. Such records obviously are very valuable, but unfortunately their value is limited to the particular individuals who have built them up. It would be useful, therefore, if some simple scheme could be devised which would enable all those interested in technical terminology to exchange notes and to pool the results they have obtained. With a view to this an article entitled "How translators can contribute to improving scientific terminology," prepared in Unesco, was printed in *Babel*, the new quarterly journal issued by the International Federation of Translators formed two years ago with Unesco's support. This article was to be discussed at the second congress of the Federation at Rome in February 1956, and there is every hope that thereby something useful may be started which will lead to the creation of a loosely connected network of terminological bureaux in different subject fields and for different languages. An experimental prototype for such a bureau, purposely containing very mixed material, now exists within the Secretariat of the Department of Natural Sciences. The idea is that such bureaux on the one hand could act as information agencies to inquirers on questions of special terminology and on the other hand they would be collecting, from very varied sources, the raw material which could be considered and processed for publication in dictionaries.

Terminology, however, is only one facet of the language problem of science. Individual terms, it may be said, are to language what the contents of a builder's yard are to architecture. In its most general expression, the language problem of science may be stated in the fact that something like half the world's scientific literature is unexploitable by something like half of the world's scientists, because it is printed in languages which they cannot themselves read.

There are, in principle, three ways open for tackling this situation: the literature can be translated for the benefit of the people potentially interested, steps can be taken to improve the ability of scientists and technologists to read foreign languages for themselves, or endeavors can be made to persuade scientific authors and publishers to produce the literature in some language or languages more widely understood than those now in use—the logical limit to this being a single world language, whether natural or artificial.

Each of these three possibilities has its advantages and disadvantages. All three are exhaustively discussed in a Report on Scientific and Technical Translating and other aspects of the language problem which Unesco has now completed with the aid of some hundreds of experts in many countries who generously gave time to submitting comments and suggestions on a draft which was circulated to them. The report was scheduled for publication in 1956. A preliminary outline of its contents was given in an article entitled "The Language Problem of Science" which appeared in *Research* (London), in May 1954.

Finally, this opportunity may here be taken to state that a *Monthly Bulletin on Scientific Documentation and Terminology*, giving news on these developments, references to bibliographical publications and reviews of newly published special dictionaries, is produced by the Department of Natural Sciences. This is available free of charge to persons and organizations constructively interested in its contents. A sample copy will gladly be sent on direct application; but as it is a mimeographed "working series" document, not a "publication," it is not obtainable through the sales agents.

Appendix V

International Utilization of Recorded Knowledge

Burton W. Adkinson, *Library of Congress*

The twentieth centry has witnessed an increase in the commerce of ideas between nations and individuals which is totally unprecedented. It is only repeating the obvious to state that the world is drawing closer and that physical as well as intellectual isolation can exist today only in scattered and fragmented pockets. The influence of a second World War, and the tensions of the cold war that followed, on the interdependence of people and on the needs for information are also obvious. Perhaps less obvious is the fact that the efforts by the major protagonists in both the hot and cold wars to provide barriers to information have been relatively unsuccessful. If anything, these barriers have probably stimulated efforts to secure information and to coordinate its effective dissemination and utlization.

Another significant tendence, particularly evident in the more recent decades, has been evidenced in the acceleration of intellectual activity throughout the world with particular emphasis on the support of such activity in the so-called underdeveloped areas. Programs of technical assistance, mutual assistance, the use of counterpart funds, of international agencies such as the United Nations and Unesco, the International Labor Office, and the World Health Organizations, have directed themselves to broad as well as specific goals in this field.

Projects involving libraries, documentation centers, fundamental education, preparation of bibliographies, compilation of statistics, etc., have not only accomplished many of the immediate purposes of raising the level of these activities, but as side products have also increased the absolute number of "records of information." The result has been a dramatic increase in recent years of periodicals and books. The rate with which they roll off the presses of the world is so great that no single library can any longer hope to cope with the deluge.

And also on the international scene, we find a heightened awareness of the need for international cooperation in dealing with the problems involved in the utilization of recorded knowledge. We find various international bodies and organizations directing their efforts in whole or in part to solve problems specific to their interests but which have assumed such complexity that only through organized international effort can reasonable solutions be approached.

PROBLEMS

It would be very desirable to be in a position in which facts or a body of facts could be marshaled, examined, and then rationalized to obtain a broad view of the current status of the international utilization of recorded knowledge. Unfortunately, this appears to be difficult if not impossible. At best, perhaps, one can point to problems and questions, and through their elaboration secure an impression of the present situation.

The first problem is to decide the magnitude of the subject under review. How much recorded information is available for utilization? More specifically, how many books and periodicals are being published each year in different countries? In what subject fields? Of what quality? Oriented to which class or classes of users? In what size editions? At what cost to the user? And through what means other than purchase can access be obtained? Nor should these questions be limited to books and periodicals. They also apply to maps, films, music, iconographic records, phonorecords, and others.

The information at our disposal is extremely limited. The complete information needed to answer these questions is not available for any one country of the world today. Only some of the information is available in greater or lesser detail for a number of areas (3). The most recent efforts to collect statistics in this area were pursued by Unesco with somewhat disappointing results, which are less the fault of Unesco than of the nature of the situation which defies effective statistical collection.

An examination of the problem encountered in this effort is diagnostic of the problems that are typical. In the United States, for example, there is no single body or office empowered to collect and report figures for the book production of the country. Census statistics reveal level of manufacture and are not indicative of number of titles, subject coverage, etc. Unesco has relied on the "Weekly Record" published in each issue of *Publishers' Weekly* for U. S. statistics. The "Weekly Record" is devoted mainly to reporting trade publications, and then only those which are voluntarily sent in by publishers. The number of books—12,050 in 1953, 11,840 in 1952, 11,255 in 1951—is not representative in true measure of the trade publications of the country let alone the recorded information contained in state and federal government documents, serial publications whether periodical or otherwise, not to mention unpublished reports, theses, and publications issued in editions too small to warrant consideration from a trade point of view. The same is true to a large extent for the statistics reported for the United Kingdom. In other areas, where there is a type of measure of centralized control and record of publication, one encounters difficulties inherent in the varying interpretations of the meaning or the word "book" or "pamphlet." Such limitations and differences of interpretation permit no valid comparison of statistics between countries, nor any sort of cumulation of essentially unlike numbers into a total for the world as a whole.

One important guide to this indeterminate record of information prepared by the presses of the world is the national bibliography. National bibliography has become more and more important as a device to secure representation of informational resources. It is generally true, although perhaps not surprising, that those countries which have the best developed publication's pattern are also those with the best bibliographic apparatus, and those countries where the need for national bibliography is the greatest are the ones which demonstrate significant lag in its preparation. Even here, though, caution must be observed because as one outstanding exception mention may be made of the United States, which does not possess a national bibliography except insofar as it may be construed through the availability of such tools as the *Cumulative Book Index*, the *Library of Congress Catalog; Books-Authors*, and others. There is progress to be noted in the countries of Latin America and of the Near and the Far East which brings us closer toward the knowledge not only of what information is used but also what information is currently being produced for use.

Availability of, and access to, national bibliography are not always synonymous. *Knizhnaia Letopis'*, the Soviet national bibliography which has been published since 1907, was unavailable in this country since the early '40's; and only recently has the Library of Congress renewed its receipt of this publication.

A very practical purpose served by national bibliography is to permit equitable exchange of official and other publications between national library centers and other institutions of different countries. The need for satisfactory bibliographic tools to facilitate exchange of publications is stressed in the recent description of proposals by Unesco for a new international exchange convention (4) in which

the preparation of adequate bibliographic tools would be an integral feature of the projected multilateral convention.

The task which faces the international library or bibliographic fraternity is that of developing the elemental structure of national bibliography. At some future date, when this structure is well developed, it may be possible to seek standardization of format and arrangement so that each national bibliography does not present unique problems for its user. This emphasis upon national bibliography is offered as a more extended illustration of the more general problem concerning the approaches to published information which also include union catalogs, union lists, literature surveys, documentation of contents of periodicals, abstract and indexing services organized on broad or specific subject bases, etc.

MECHANICS OF UTILIZATION

For most of the world, the library and its facilities serve as the principal agency for the utilization of recorded information. In the United States and in many of the countries of Europe and elsewhere, library developments have permitted and even required a degree of specialization which is reflected in the concurrent development of the special library and the documentation movements. These movements are undoubtedly results of adaptive processes designed to meet the special needs of definable classes of users. A more penetrating analysis would reveal that the situation of changing needs and changing clientele has caused a differentiation of library functions in which generalized service and universal collections have been sacrificed for the more efficient and direct service of the special library and the documentation center.

Although widespread, the development and fruition of special libraries and of documentation are fairly recent and on the world scene are still relatively fresh innovations. A recent survey by Pietsch (5), Director of the Gmelin Institut, describes documentation establishments in twenty-eight countries; at least some of these are so only by courtesy of designation or through newly organized participation in the general activity which we understand under the term "documentation." Some of the twenty-eight are only now in process of being developed under Unesco stimulus as in Egypt, India, Mexico, Uruguay, and Yugoslavia.

A striking feature about the development of libraries, general and special, in relation to the problem of the international utilization of recorded information lies in the uneven development of the individual library when considered in both a historical and cultural setting. Some libraries have started as adjuncts to the educational process with special children's services or reader advisory services, and have added specialized documentation services to their functions in order to cope with current demands. Such functions include photoduplication, translation services, abstracting and special bibliographic services, and often research services. The older libraries have added the new while maintaining the old. The newer libraries or documentation centers have limited themselves to providing the type of service demanded by the current and predominant class of users. In countries where library developments are only in a state of emerging prominence, the new organizations seem to be taking advantage of experience in architectural and mechanical advances and even in the lessons of cooperation which had to be learned the hard way in the more experienced countries. For example, an Italian union catalog saw its inception in February of 1951 and is being implemented through the use of Remington Rand mechanical selection equipment (6); whereas in the United States, perhaps because of its size and maturity, the National Union Catalog still depends on the voluntary submission of 3 x 5 cards in a variety of styles of entry which complicate the problem of editing for uniformity and for publication. Children's library in the Gold Coast, bookmobiles in Egypt, and other examples can be enumerated of modern experience being exploited in the so-called backward or under-developed areas.

Again referring to the documentation establishments or centers described by Pietsch, it is well to note that special bibliographic and abstracting services appear to form one of the core activities of such documentation centers. It should be emphasized, however, that abstracting services of many types are rendered in even greater number outside such centers. A recent survey of engineering abstracting services by a Committee on Engineering Abstracting Services of the Special Libraries Association (7) lists 231 sources of published documentation of current literature in this field. Gray and Bray (8), in their study of abstracting and indexing services of physics interest, listed 145 such services of interest to physicists. The problem of overlapping and duplication of and by these services, the difficulties in establishing firm boundaries between tangential scientific fields, and in developing cooperation and coordination among such services, are now on the agenda of numerous organizations. These problems need not be elaborated here.

CULTURAL CONDITIONING

It is not difficult to discern that the development of librarianship, special librarianship, and documentation is rather specifically culturally conditioned. Without embarking on a sociological analysis, it is safe to generalize that documentation has been a function of Western industrialization. It has been transmitted to other, non-Western countries in much the same manner that the Western industrial complex itself has been transmitted. Insufficient attention has perhaps been given to the importance of cultural determinants of the patterns which dominate the utilization of recorded information.

In the problem area of bibliographic control, for example, the standard approaches have usually been through two key avenues: one is through subject headings and the other through classification schemes. In our large country, speaking a uniform language, classification has to a great extent been the device for locating materials on the library's shelves. The subject approach has been more widely served through lists of subject headings which are traced in card catalogs or dominate bibliographic arrangements. Europe has been much more concerned with classification schemes as an approach to effective control, perhaps because of the diversity of languages spoken among the smaller political units of the continent. And as the library fraternity embraces areas of the Eastern world, we find that its contributions lean to the classification side as one means of conquering the obstacle of language difference in communicating and controlling information.

The difference in language and other differences between cultures have interposed difficulties in the uniform utilization of their publications which have resulted in efforts on the part of librarians to standardize—to effect standardization in the codes of author entry, for descriptive cataloging, for abbreviation of titles of periodicals, their citation, and the cataloging of motion picture films and other materials that find their way into the collections of libraries.

There are other differences. We know of the pattern of publication in this country which places a premium on the best seller and which is generally reflected in large editions, advertising budgets, dealer discounts, reprints in paper-back form; smaller editions published by university or specialized presses; the publications of vanity presses, etc. In some other countries, perhaps less developed in some respects, the edition pattern is quite different. Editions are smaller and appeal to a more restricted segment of the population because of literacy factors. Individual stocks are quickly exhausted in many instances. The number of titles may be as large or larger than for some of the so-called advanced countries. If we arrange countries for which we have recent statistics of publication (the year 1952 serving as the best year by virtue of being the most recent year with data for the largest number of countries) (9) in rank order according to total number of titles published, the following relationship emerges:

United Kingdom	18, 741	Norway	2, 704
West Germany	13, 913	Turkey	2, 447
Japan	12, 950	Bulgaria	2, 031
United States	11, 840	Finland	1, 748
France	10, 410	Vietnam	936
Italy	9, 679	Indonesia	778
Netherlands	6, 728	Canada	684
Yugoslavia	5, 184	Australia	627
Belgium	4, 610	New Zealand	327
Portugal	4, 153	Ceylon	268
Austria	3, 903	Ireland (Rep.)	149
Spain	3, 445	Monaco	104
Sweden	3, 286	French Morocco	100
Switzerland	3, 245	China (Taiwan)	76
Brazil	3, 208	Panama	22

These statistics are apparently subject to marked annual fluctuations and changes. Space does not permit the pursuit of the more interesting analysis of the relative subject concentration among the different countries. Some examples may serve, however. In 1953, about 50% of the titles published in Indonesia fell in the social sciences compared with 8% in the United States, 31% in Brazil, 15% in Austria, 9% in France, and 15% in the United Kingdom. In the field of philology, Indonesia actually published more titles than did the United States, 198 as compared to 183. These data are offered and must be taken with considerable reservation as to their reliability and comparability, but they are indicative of differential patterns which deserve further attention and analysis.

A final thought on the subject of cultural differences and the language factor relates to the fact that the current increase in national sentiment with its component "anti-colonialism" has perhaps exaggerated the language problem but may also continue to make it important for some time to come. English, French, and German may not suffice for scientific communication in the future. Scientific progress in India, to select one country, may very likely be recorded in Hindi and Urdu. One should not be surprised if the future will find increasing scientific and technical publication in languages which are commonly designated under the collective term, "vernacular." We have seen the development of translation projects and bibliographies of translations in order to cope with scientific progress recorded in the East European countries; and because of identical circumstances we read of similar projects conducted in the Soviet Union and Eastern Europe. In other words, there are contradictory trends—those that bring areas of the world closer together because of the growth of common needs and because of the development of common techniques to satisfy these needs, and trends that increase the distance because of the intensification of cultural differences due, it is hoped, to transient consequences of the global interplay of social and political forces.

INTERNATIONAL COOPERATION—INTERNATIONAL ORGANIZATIONS

The diversity and the general complexity of problems that focus on the international utilization of recorded knowledge are very clearly displayed on the stage which is provided by the work of international organizations with active interests in this field. It is interesting to note that a total of more than 1,100 international organizations were listed for 1954 in the *Yearbook of International Organizations*. Organizational activity of this type is on the increase. By way of contrast, there were 957 such organizations in 1952, and only 705 in 1938. In the year 1954 there 1,112 international meetings. Four years earlier, in 1950, there were 725 international meetings recorded (10). During the period 1950–1954 there were 88 international meetings concerned solely with the problems of documentation and the press. Each of these meetings, as well as other activities of these international organizations, result in the production of recorded knowledge.

The work of Unesco has been adequately described in this connection and needs little further elaboration here (11, 12). Mention may be made, however, of Unesco's concern with the coordination of international activities, especially in encouraging collaboration between F. I. D. (International Federation of Documentation) and I. F. L. A. (International Federation of Library Associations). Such coordination seems even more necessary now than when Unesco first appeared on the scene, particularly if one takes note of the growing proliferation of international organizations in special fields or representative of special groups with frequent overlapping and duplication of efforts. Alexander King's paper in the Aslib Proceedings of 1954 (13) comments, among others, on the faults of the present situation which include such factors as the composition of international bodies (which frequently are generated through the dedicated efforts of amateurs or professionals but eventually attract the fanatic in addition to the amateur and the enthusiast); the fault that cooperation becomes an end in itself while the reason for cooperation is forgotten; the fault of the progressive increase in size of the international conference with the bogging down of efficient action and inevitable frustration; the simultaneous meeting of subgroups and subcommittees which prevent coherent grasp of the over-all program of the conference; and also the ever-present need to compromise national interests at the level of the lowest acceptable common denominator which usually satisfies neither the proponent nor the opponent. King, however, also stresses the positive side of the international work, the sharing of new knowledge based on universally accepted principles that are not and cannot be the monopoly of any one individual or country, and the recognition that in many areas cooperation brings economy and efficiency to the cause and course of advancing knowledge.

King distinguishes two types of international organizations—the international intergovernmental bodies such as Unesco, FAO, WHO, the OEEC, etc., and the nongovernmental bodies of the single discipline type such as I. F. L. A., F. I. D. and the I. S. O. (International Standards Organization) to which we would add unions of international organizations such as the I. C. S. U. (International Council of Scientific Unions) and the U. A. T. I. (Union of International Engineering Organizations). All have very apparent interests in documentation and bibliographic control and organization. There is a strong interconnection between these two types and within each of the types. National interests. normally not political but frequently subject to political interpretation, are commonly experi-

enced in all groups with either national representation or participation through national affiliates.

Of the international organizations with special interest in bibliographic or documentation activities described by Brownson (2), nine organizations can be distinguished with primary concern in the fields of librarianship, documentation, or control of information; seventeen international organizations whose principal interest is in scientific or technical activities but have significant programs derived from the problems faced in the realm of control of information; and similarly, six such organizations in the social sciences, three in the humanities, and at least eight regional international organizations emphasizing documentation activities. This interest in documentation problems among organizations whose prior concern is primarily in other fields of inquiry speaks well for the vitality of the issues facing the documentalist. It also suggests the need for attention to the problems of conflict of interests, exaggeration of superficial differences between organizations facing common problems, and the need to develop a common and coordinated approach in order to maximize possibilities for their successful resolution.

There is still one feature in the picture of international utilization of recorded information which requires mention. This is the feature of rapid change, even possibly overnight change in some of the relationships and problems that have been touched on. Consider the possibilities inherent in the projected construction of the Aswan High Dam Project on the Upper Nile. The cost will be approximately $1.3 billions, and it will require from 15 to 20 years for completion. It will result in the generation of power to further the industrialization of Egypt, and the irrigation of 2 million acres of now arid land. It is a fabulous project, one of great imagination and possibly greater consequences. Consider the information needed during the complex stages of its development to assure smooth and even progress. The informational needs will not arise merely upon the completion of the project. One may assume that needs will exist in a changing variety throughout its course, even at the very beginning. These needs will be social, scientific, technical, medical, etc., in order to cope with problems as they arise—very likely problems which have been met successfully in other areas and whose solution will be facilitated by accessibility to the proper documentation. It is possible that examples such as these may be multiplied in the future. It is also possible, as a very direct result, that the conventional relationships between the so-called development of a country and its informational resources and informational needs may become quite reversed. If dynamic projects with social as well as physical consequences are generated with any frequency in the less developed areas, the present pace of needs which requires stimulation may change to a pace in which it may become difficult to keep abreast of the demand for recorded information.

PROSPECTS AND PROGRESS

The foregoing, however extended, has been only a sketch of some of the problems of concern to those professionally active in dealing with recorded knowledge. If only in summary, it may nevertheless be of interest to describe some of the areas in which advances can be anticipated or in which research and cooperate effort need still to be expended in order to ensure the desired progress:

(a) Information theory will receive more detailed attention during the course of the immediate future with its promise of new vistas for the development of tools and mechanics for use by the library and documentation professions in making available the recorded advances in knowledge and information;

(b) The legal developments toward the fuller implementation of the recent Universal Copyright Convention will encourage the flow of documents and non-book records, with the protection of the citizens of the signatory nations divorced from much of the earlier needs for deposit and registration in every country where the material might be of interest.

(c) The broad efforts to obtain standardization and development of international codes such as for the abbreviation of titles of periodicals, for their layout, for bibliographic citations and references, and for rules of author entry will tend to bridge some of the cultural barriers previously mentioned (14, 15).

(d) Improvement in the techniques of abstracting and indexing, as well as coordination of these activities in specific subject fields on an international scale, will do much to disseminate information on advanced research and knowledge in these areas.

(e) The standardization of transliteration codes and the coordination of translation activities need to be pursued with vigor. The coordination of activity that has been accomplished to date shows that great strides in the dissemination of knowledge can be achieved through these means.

(f) One cannot overlook the need to pursue vigorously the improvement of the present and the development of new union catalogs, national bibliographies, and union lists which are the tools basic to the progress of many of the other activities mentioned above.

(g) And finally, the great need for international agreements as well as for the effective implementation of these agreements in fields of international exchange of publications, the adoption of enlightened and uniform copyright codes, removal of tariff and customs and censorship barriers will require consistent attention. Without progress along these lines, activities in the above-mentioned areas will necessarily be restricted.

CONCLUSIONS

It should not be assumed that because problems have been singled out for attention that one would be justified in a pessimistic view about the international scene in relationship to the utiliztion of recorded knowledge. The contrary is true. We find that these problems create a categorical imperative which demands solution. Illiteracy among the masses of the world is gradually diminishing. Scientific efforts increase as the economies of the world evolve from the old agrarian to the modern industrialized types. Such changes breed economic and social interdependence and have as their immediate product the acceleration of communication within the larger society. Increased communication is in turn the parent of the informational record, the book, the periodical, the pamphlet, the map, and picture. Each part of the world community learns from every other part, each will strive to keep abreast of the other with respect to the good things it values, and each will try to perfect the means of exploiting to the fullest the information at its disposal toward the goal of better living. This will be true, as a matter of fact, whether we are living in a climate of peace, in one of dormant hostility, or in one of actual war.

Even as our collections increase in ever mounting numbers, and as we attempt to cope with the problems of selection and bibliographic control, we can point to parallel movements in the formation of means and methods of solving the problems that are generated. We can point to the growth of union catalogs, the development of regional, national, and international library lending, and to cooperation in other spheres of library concern. We see the growth and perfection of microphotography as a medium for the dissemination of information at the international level, and the increased use of electronic equipment in a variety of ways to meet library and documentation needs. We see research in semantics married to application of probability mathematics in efforts to solve classification problems implemented via the digital computer. We have also, and very significantly, seen the development of an awareness of the need for the extension of fundamental research into the realm of librarianship and documentation, an awareness which is highlighted by this very conference and which gives us additional reason to view the international scene not with comfortable complacency, but rather with an optimism that we are facing a challenging situation and that we have the physical and intellectual capacity as well as the desire and the energy to approach mutual and cooperative solutions.

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(The following communication was received too late to be incorporated in the body of the hearings and is included at this point:)

ENGINEERING SOCIETIES LIBRARY,
A DEPARTMENT OF THE UNITED ENGINEERING TRUSTEES, INC.,
New York, N. Y., July 25, 1958.

Mr. WALTER L. REYNOLDS,
Chief Clerk and Staff Director, Committee on Government Operations,
United States Senate, Washington, D. C.

DEAR MR. REYNOLDS: The following information about the Engineering Societies Library and the Engineering Index is submitted to you for the Subcommittee on Reorganization for the study of the documentation phases of the proposed Science and Technology Act of 1958. The information is being supplied at the suggestion of Mr. W. T. Cavanaugh, of Engineers Joint Council, as proposed in your letters of June 20 and July 3, 1958, to him.

I am Ralph H. Phelps, director of the Engineering Societies Library for the past 13 years, and I have had a total of nearly 30 years of experience in scientific, technical, and engineering library and information work. In 1949, I was an adviser at the UNESCO Conference on Science Abstracting held in Paris. I am a member of abstracting committees of the Special Libraries Association and of the Engineers Joint Council. I am also vice president of the board of directors of the Engineering Index, Inc.

The following deals primarily with the Engineering Societies Library and the Engineering Index, Inc., which are separate organizations, but which cooperate closely in providing documentation services for the engineering profession. I will also make some additional comments, part of which are on statements made at the hearings of May 2, 6, and 7, on S. 3126.

The Engineering Societies Library was established in 1913 through the merging of the long-established libraries of the American Society of Civil Engineers, the American Institute of Mining, Metallurgical, and Petroleum Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

The Engineering Societies Library is outstanding in its coverage of the fields of civil, electrical, mechanical, mining, metallurgical, and petroleum engineering. It also extensively covers chemical engineering and all other branches of engineering, primarily on the level of the graduate and practicing engineer. The library contains over 175,000 volumes. Some 1,500 periodicals are currently received from all parts of the world; about one-third of these are in foreign languages. The coverage of Russian and other Eastern European scientific and technical publications has been considerably expanded recently and important publications are continuously added. The Engineering Societies Library is primarily used by engineers, but it is open for free use by anyone. The staff of the service department of the library, for a fee, makes literature searches, prepares bibliographies, translates from any language into English, and provides photoprint or microfilm copies of material in the library.

All publications received by the Engineering Societies Library are made available to the Engineering Index, which is housed in the same building. The Engineering Index, now in its 74th year, is an internationally accepted digest of technological literature prepared for engineers, research workers, and students. The Index reviews 1,400 leading periodicals and society transactions, as well as a substantial number of bulletins and reports of Government bureaus, research

laboratories, technological institutes and colleges, and other agencies. Last year the service provided annotated references to 27,000 articles. The Engineering Index issues a weekly card service in 255 subject divisions. Subscriptions may be placed for one, or several, or all subject divisions. The cost of the divisions ranges from $12 to $45 each, with a total cost of $1,500 for the complete card service. Educational institutions receive a discount. The Index subsequently appears as a bound volume cumulating into one volume all of the references for the year. The charge for this bound volume is $70.

The Engineering Index is an up-to-date indexing service, complete with descriptive annotations of the material indexed. Inasmuch as all indexed material is retained by the Engineering Societies Library, there need be no question as to where to find the original of any article indexed in the Engineering Index. The article may be read at the Engineering Societies Library, which is open to anyone, or a photoprint or microfilm copy may be ordered.

The four engineering societies which established the Engineering Societies Library contributed this year about $100,000 toward the expenses of operation of the library. The Engineering Index is entirely self-supporting, except that it has access, without charge, to all publications received by the Engineering Societies Library. The income of the Engineering Societies Library and the income of the Engineering Index, Inc., have never been sufficient for as thorough coverage of the engineering literature as the organizations would like to provide; however, the coverage is extensive, though selective. A certain degree of selectivity has advantages as there are among the so-called engineering periodicals some of doubtful value for research as they are beamed to the trade for advertising purposes. These must be screened by any good reference service, so that the researcher need not waste his time in consideration of material of little worth. The success of both organizations in rendering information services at reasonable cost is amply demonstrated by the length of time which both have been in existence and the extent of their usage which is worldwide.

Should any expansion of technical information services for engineers be contemplated, I believe that it should be through such documentation centers and services as are provided by the Engineering Societies Library and the Engineering Index.

The above completes my statement with regard to the Engineering Societies Library and the Engineering Index.

I now wish to comment on some statements made during the Hearings of May 2, 6, and 7, 1958, as well as on various aspects of the general field of technical information services.

In Mr. Kastens' testimony, on page 126 of the hearings of May 6, 1958, he states that in 1940 there were about 200 special libraries in existence. This appears to be incorrect, for in 1935 the Special Libraries Association issued a volume entitled "Special Libraries Directory of the United States and Canada," which lists 1,115 special libraries in the United States.

I agree with Mr. Maxwell, who testified at the hearings, that the abstracting services now in existence are not as bad as they are made out to be—I would say, not nearly that bad. While abstracting and indexing services may not be as up to date as they would wish to be, or as users would wish them to be, my experience as a user of many indexing and abstracting services is that none of them, certainly none of the better known ones, is even close to being 6, 7, or 8 years behind in its abstracting or indexing, as indicated by Mr. Kastens, on page 138.

If the Soviets have profited more than we have from the technical literature, I would believe that they may have worked harder at using it. The Soviet centralized information services are not essentially better than the services available in this country; Soviet abstract services are in general poorly indexed compared to ours, and so are therefore difficult to use. Incidentally, in 1957 the Soviets purchased 54 copies of the 1956 bound volume of the Engineering Index which is published in the United States.

The proposition that research work should be preceded by a literature search is frequently spoken of, as it was in the hearing; however, I know from experience that all too seldom is any substantial literature search made. We find at the Engineering Societies Library that companies which plan to spend thousands, or hundreds of thousands of dollars in so-called original research are often unwilling to spend even a few hundred dollars or possibly a week or two of time for any literature research. Perhaps this is due to the dramatic sales appeal of laboratory research, or failure to comprehend the value of literature research, or perhaps merely because literature research is considered to be drudgery. Personally, I believe this to be a costly misconception.

Mr. Kastens' testimony gave the impression that literature searches generally take a great amount of time (he mentioned 6 months as 1 example) and that searches cost from $1,000 to $100,000 and even more. He also stated that "the little man is out." The Engineering Societies Library makes many literature searches each year for from under $100 to under $1,000. These are not complete literature searches and they may not deal with the largest and the most complex problems, but how often does the little man deal with these. Letters of commendation and additional orders from those who have used the services of the Engineering Societies Library attest to the value of these inexpensive literature searches.

I would suggest that the Government should, probably through the National Science Foundation, give assistance in the support of projects such as some being considered by the National Federation of Science Abstracting and Indexing Services, which should help to improve existing indexing and abstracting services. I do not believe that a large Government operation in the field of documentation is either necessary or economically desirable. Organizations which provide a useful information service will be supported in the typical American way by those who find the services useful.

I wish to express appreciation for the opportunity to supply information about documentation services to engineers, as this field had not previously been covered by the hearing.

Sincerely yours,

RALPH H. PHELPS, *Director.*

(The Engineering Manpower Commission of the Engineers Joint Council submitted for the committee's consideration an article entitled "The Support of Scientific Research" by William D. Carey, Bureau of the Budget, which was printed in a publication issued by the National Science Foundation, entitled "Scientific Manpower—1957." It has been incorporated in the files of the subcommittee.)

NOTE.—By direction of Senator Hubert H. Humphrey, chairman of the Subcommittee on Reorganization, the staff is now assembling information for the preparation of a progress report on legislative and administrative actions taken to implement the various provisions of the proposed Science and Technology Act of 1958, as set forth in the staff analysis and summary of the act, in Senate Document 90, 85th Congress. This progress report will be submitted for approval of the Committee on Government Operations and made available at the earliest possible date.

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LEGISLATIVE HISTORY

Public Law 85-934
S. 4039

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Digest of Public Law 85-934. 2

INDEX AND SUMMARY OF S. 4039

June 20, 1958	Sen. Humphrey introduced S. 4039 which was referred to the Senate Government Operations Committee. Print of bill as introduced. Remarks of Sen. Humphrey.
June 24, 1958	Rep. Harris introduced H. R. 13091 which was referred to the House Interstate and Foreign Commerce Committee. Print of bill as introduced.
July 30, 1958	Senate committee reported S. 4039 with amendments. S. Rept. No. 2044. Print of bill and report.
Aug. 4, 1958	Senate passed S. 4039 with amendments.
Aug. 5, 1958	S. 4039 was referred to the House Interstate and Foreign Commerce Committee. Print of bill as referred.
Aug. 13, 1958	House committee ordered S. 4039 reported.
Aug. 15, 1958	House committee reported S. 4039 with amendments. H. Rept. No. 2640. Print of bill and report.
Aug. 22, 1958	House passed S. 4039 with amendments under suspension of the rules.
	Senate concurred in House amendments.
Sept. 6, 1958	Approved: Public Law 85-934.

DIGEST OF PUBLIC LAW 85-934

FEDERAL GRANTS FOR SCIENTIFIC RESEARCH. Provides that heads of Federal agencies, authorized to contract for basic scientific research with non-profit institutions of higher education or other non-profit organizations, are authorized to make grants to such institutions or organizations for the support of basic scientific research. Provides that the authority to make such contracts or grants includes the authority to vest in the institution or organization title to equipment purchased with such grant or contract funds. Provides that departments and agencies exercising this authority shall make annual reports on or before June 30 each year to the appropriate committees of both Houses of Congress regarding such grants.

85TH CONGRESS
2D SESSION

S. 4039

IN THE SENATE OF THE UNITED STATES

JUNE 20, 1958

Mr. HUMPHREY (by request) introduced the following bill; which was read twice and referred to the Committee on Government Operations

A BILL

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at institutions of higher education or other nonprofit organizations, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make such grants, or to make contracts for the conduct of basic or applied scientific re-

search at institutions of higher education or other nonprofit organizations, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

85TH CONGRESS
2D SESSION

S. 4039

A BILL

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

By Mr. HUMPHREY

JUNE 20, 1958
Read twice and referred to the Committee on Government Operations

REPORTS OF COMMITTEES

The following reports of committees were submitted:

By Mr. CHAVEZ, from the Committee on Public Works, without amendment:

H. R. 12613. An act to designate the lock and dam to be constructed on the Calumet River, Ill., as the "Thomas J. O'Brien lock and dam" (Rept. No. 1734).

By Mr. WATKINS, from the Committee on Interior and Insular Affairs, with an amendment:

S. 2517. A bill to amend sections 2275 and 2276 of the Revised Statutes with respect to certain lands granted to States and Territories for public purposes (Rept. No. 1735).

PAYMENTS OF RETROACTIVE COMPENSATION FOR SERVICES PERFORMED DURING JANUARY 1958—REPORT OF A COMMITTEE (S. REPT. NO. 1733)

Mr. HENNINGS, from the Committee on Rules and Administration, reported an original resolution (S. Res. 316) authorizing certain payments of retroactive compensation from current funds for services performed during January 1958, and submitted a report thereon; which resolution was placed on the calendar, as follows:

Resolved, That payments of retroactive compensation authorized by law for service performed in the month of January 1958, which are chargeable to funds authorized for expenditure through January 31, 1958, by various Senate Resolutions, shall be charged to funds authorized by Senate Resolutions for expenditure by the committees concerned at the time such payment is made, wherever possible, without regard to the expenditure limitations contained in the Senate Resolutions which expired on January 31, 1958.

BILLS INTRODUCED

Bills were introduced, read the first time, and, by unanimous consent, the second time, and referred as follows:

By Mr. MURRAY (for himself, Mr. MALONE, Mr. CHURCH, Mr. WATKINS, Mr. MANSFIELD, Mr. ALLOTT, Mr. BIBLE, and Mr. BARTLETT):

S. 4036. A bill to stabilize production of copper, lead, zinc, acid-grade fluorspar, and tungsten from domestic mines; to the Committee on Interior and Insular Affairs.

By Mr. MAGNUSON:

S. 4037. A bill for the relief of the estate of William Pitt Waggener; to the Committee on the Judiciary.

By Mr. IVES:

S. 4038. A bill to amend the International Cultural Exchange and Trade Fair Participation Act of 1956 by providing for exchanges of athletes; to the Committee on Foreign Relations.

By Mr. HUMPHREY (by request):

S. 4039. A bill to authorize the expenditure of funds through grants for support of scientific research and for other purposes; to the Committee on Government Operations.

(See the remarks of Mr. HUMPHREY when he introduced the above bill, which appear under a separate heading.)

RESOLUTION

Mr. HENNINGS, from the Comittee on Rules and Administration, reported an original resolution (S. Res. 316) authorizing certain payments of retroactive compensation from current funds for services performed during January 1958, which was placed on the calendar.

(See resolution printed in full which appears under the heading "Reports of Committees.")

EXPENDITURE OF FUNDS THROUGH GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH

Mr. HUMPHREY. Mr. President, I introduce for appropriate reference, a bill which is in response to a request submitted to the Congress by Dr. Alan T. Waterman, Director of the National Science Foundation earlier today, to authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

This bill is in general accord with the objectives of title II of a bill, S. 3126, the so-called Science and Technology Act of 1958, which I introduced on January 27 of this year, providing for the establishment of national institutes of scientific research. The objectives of this proposal was set out in Senate Document No. 90, An Analysis and Summary of S. 3126, prepared by the staff of the Committee on Government Operations—pages 41–48.

The Subcommittee on Reorganization, of which I am chairman, has already scheduled hearings on June 25 and 26 on one of the provisions of S. 3126, relating to assembling, collating, indexing, retrieving, and disseminating scientific information. Witnesses who are scheduled to appear at that hearing include Dr. Waterman, Director of the National Science Foundation, and representatives of other agencies that would come within the purview of the bill which I am introducing, such as the Department of Defense and the Atomic Energy Commission. Spokesmen for these agencies will be requested to give the committee the benefit of their views on both proposals.

I ask unanimous consent that the bill, together with the letter from Dr. Waterman, and an explanation of the bill be printed in the RECORD, as a part of my remarks.

The PRESIDENT pro tempore. The bill will be received and appropriately referred; and, without objection, the bill, letter, and explanation will be printed in the RECORD.

The bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research and for other purposes, introduced by Mr. HUMPHREY (by request), was received, read twice by its title, referred to the Committee on Government Operations, and ordered to be printed in the RECORD, as follows:

Be it enacted, etc., That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at institutions of higher education or other nonprofit organizations, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make such grants, or to make contracts for the conduct of basic or applied scientific research at institutions of higher education or other nonprofit organizations, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

The letter and explanation presented by Mr. HUMPHREY are as follows:

JUNE 18, 1958.

The HONORABLE RICHARD M. NIXON,
President of the Senate,
Washington, D. C.

MY DEAR MR. VICE PRESIDENT: The National Science Foundation, in accordance with its statutory authority to encourage the pursuit of national policies for the promotion of basic research and education in the sciences, herewith transmits a legislative proposal, together with an attached explanation, which would authorize agencies of the Federal Government engaged in support of basic scientific research at institutions of higher education or other nonprofit organizations, to make grants for the support of such basic scientific research, and to vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with grant or contract funds provided for the support or conduct of such research.

The Bureau of the Budgft has advised us that it has no objection to the submission of this legislation.

Sincerely yours,

ALAN T. WATERMAN, *Director.*

EXPLANATION OF DRAFT BILL DEALING WITH EXTENSION OF GRANTING AUTHORITY TO ADDITIONAL AGENCIES AND VESTMENT OF TITLE TO EQUIPMENT PROCURED WITH GRANT OR CONTRACT FUNDS

1. USE OF GRANTS FOR THE FEDERAL SUPPORT OF BASIC SCIENTIFIC RESEARCH AT INSTITUTIONS OF HIGHER EDUCATION AND OTHER NONPROFIT ORGANIZATIONS

Nature of basic research: Basic research is that type of research which is directed toward increase of knowledge in science. It is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.

Present responsibilities of Federal agencies for the conduct and support of basic research: Section 4 of Executive Order 10521, dated March 14, 1954, states:

"SEC. 4. As now or hereafter authorized or permitted by law, the Foundation shall be increasingly responsible for providing support by the Federal Government for general-purpose basic research through contracts and grants. The conduct and support by other Federal agencies of basic research in areas which are closely related to their missions is recognized as important and desirable, especially in response to current national needs, and shall continue."

Magnitude and scope of present Federal financing of basic research: Total obligations for basic research during fiscal year 1958 will probably fall somewhere in the range of $200–250 million. This basic research will be carried on primarily in Federal laboratories, in research centers operated under contract for the Government, and within colleges and universities under grants and contracts from various Federal agencies. With respect to this third category, it is estimated that Federal obligations in the current fiscal year will be somewhere in the neighborhood of $100 million. While precise data are not available on this point, it would appear that around 50 to 60 percent of Federally financed basic research at colleges and universities is supported by grant and 40 to 50 percent supported by contract. Agencies currently engaged in supporting basic research at colleges and universities

include the Departments of Agriculture; Army, Navy and Air Force; Health, Education, and Welfare; Interior; Commerce; Atomic Energy Commission; National Advisory Committee for Aeronautics; and the National Science Foundation. Of these, HEW, NSF, and Agriculture have authority to make grants; the others do not.

Advantages of the grant over the contract: Where the Government desires to engage the services of an educational or nonprofit organization for the conduct of a specific piece of research directed toward a specific problem, the use of the contract form is obviously in order. On the other hand, where it is the desire of the Government to stimulate and support fundamental research in a given field, with the perimeters of inquiry limited only by the curiosity and creativity of the scientific investigator, the use of the grant form has several marked advantages.

First, the psychological relationship between the recipient institution or individual and the Government is more in keeping with the concept of maximum freedom of action for the scientific investigator. Second, the problem is avoided of endeavoring to adapt detailed contract regulations designed primarily for the procurement of hardware to the support of creative, fundamental research. Third, advance payment of the grant can be made without the vouchering of expenditures and accompanying progress reports or other proof of work—both of which exercise a deadening effect upon the initiative of the scientist.

The accompanying bill is designed to enable agencies not now having such authority to exercise discretion as to the legal instrument to be used in the support of basic research at educational institutions or other nonprofit organizations. The authority requested would be permissive not mandatory in character. If a particular undertaking were relatively narrow in scope, or if the agency for any reason desired to maintain a fairly close rein on the pursuit of the research, it could use the contract form. Conversely, if it were the agencies' desire in other cases to support fundamental research in a broad field, with full latitude for the choice of particular lines of inquiry, the grant instrument could be used.

2. TITLE TO EQUIPMENT

One of the most troublesome administrative problems involved in the Federal support of research at colleges and universities concerns the disposition of property and equipment to which the Government retains title. Although Appendix C of the Armed Services Procurement Regulations issued in July 1952 had the effect of improving regulations previously in force, the present situation continues unsatisfactory from the viewpoints of both educational institutions and the Government. The time and expense involved in keeping records of equipment may often exceed the original value of the equipment. There is unnecessary variation in the records required by different agencies and needless duplication of records by universities (despite the fact that Appendix C of ASPR assigns to the contractor the primary responsibility for recordkeeping). Much time and labor is frequently spent after termination of research contracts in the formal and often fruitless circulation throughout the Government of long lists of highly specialized equipment, particularly with respect to minor items of equipment. Furthermore, in many cases, it would be prohibitively costly to relocate major items of equipment back into a Government warehouse.

Generally, two reasons account for the retention of title by the Government to equipment obtained with Federal funds. One is of a legal character, agencies being unable to transfer title to Government property without further obligation to the Government in the absence of some tangible consideration; second is the feeling on the part of agencies that, conceivably, the Government might have need for the equipment at a different location after the termination of the research. In order to meet these two problems and to simultaneously protect the Government's interest, it is recommended that legislative authority be sought which would authorize Federal agencies supporting or contracting for research and development work at educational or nonprofit institutions to provide in the grants or contracts that title to equipment financed by the agency in connection with the research would rest with the institution without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate.

SMALL BUSINESS TAX ADJUSTMENT ACT OF 1958—ADDITIONAL COSPONSOR OF BILL

Mr. SPARKMAN. Mr. President, I ask unanimous consent that the name of the Senator from Kansas [Mr. SCHOEPPEL] may be added as a cosponsor of Senate bill 3194, the Small Business Tax Adjustment Act of 1958. This will make a total of 38 cosponsors of this most important legislation.

The PRESIDENT pro tempore. Without objection, it is so ordered.

ADDRESSES, EDITORIALS, ARTICLES, ETC., PRINTED IN THE APPENDIX

On request, and by unanimous consent, addresses, editorials, articles, and so forth, were ordered to be printed in the Appendix, as follows:

By Mr. KUCHEL:

Address on the subject Believe in the Future, delivered by Hon. Roger A. Pfaff at St. Paul's Episcopal Cathedral, Los Angeles, Calif., on May 25, 1958.

By Mr. HRUSKA:

Introductory remarks by Miss Helen Gourlay, and commencement address by Franklin D. Murphy at the University of Nebraska on June 7, 1958.

By Mr. PROXMIRE:

Editorials concerning Alaskan statehood published in recent editions of the Milwaukee Sentinel and the Milwaukee oJurnai.

By Mr. BENNETT:

Editorial entitled "Peace: By Precept and Example," published in the Deseret News and Salt Lake Telegram of June 17, 1958.

By Mr. HOLLAND:

Editorials from the Northern Virginia Sun and the Waynesboro News-Virginian, approving statehood for Alaska.

By Mr. NEUBERGER:

Editorial entitled "Alaska Just Waiting," published in the Oregonian, Portland, Oreg., of June 16, 1958, dealing with statehood for Alaska.

By Mr. WILEY:

Article entitled "Farm Price Squeeze Feeds Unemployment," written by William F. Groves and published in the Wisconsin Agriculturist and Farmer of May 17, 1958.

By Mr. JAVITS:

Article entitled "Need Seen for a United States Tourist Bureau," written by Barnett D. Laschever, and published in the New York Herald Tribune of June 1, 1958.

News release from Life magazine, June 15, 1958; and summary report by Dr. Henry C. Wallich, entitled "Conference on the Role of the Consumer in the United States Economy," June 14, 1958.

By Mr. HUMPHREY:

Article entitled "Three-Cent Minnesota Issue Made Sales Record," written by Franklin Bruns, Jr., and published in a recent issue of the Washington Post, dealing with the special commemorative 3-cent stamp for the Minnesota centennial.

Article entitled "Mideast Feels United States Backs Old Order" written by John S. Badeau, president, Near East Foundation, dealing with American foreign policy in the Middle East.

Article entitled "Why Not Make Use of United Nations Emergency Force," written by Norma Krause Herzfeld, and published in the Kansas City Register of June 13, 1958.

Article entitled "Highway Safety: Proposals and Performance," written by Abraham A. Ribicoff, Governor of Connecticut, and published in the magazine the State Government for June 1958.

By Mr. MONRONEY:

Article entitled "Let's Look at Airlift," written by Donald W. Douglas, Jr., president of the Douglas Aircraft Co.

By Mr. JOHNSTON of South Carolina:

Article in tribute to Bishop Herbert Welch and his working creed, written by Dr. Frederick Brown Harris and published in the Washington Star of June 8, 1958.

By Mr. THYE:

Letter addressed to him by Robert Mantzke, director of the Minneapolis Choralaires, regarding the possibility of having that group sing at the Brussels World's Fair.

By Mr. LANGER:

Resolutions and a letter dealing with various subjects; which will appear hereafter in the Appendix.

NOTICE OF HEARINGS ON CERTAIN NOMINATIONS BY COMMITTEE ON FOREIGN RELATIONS

Mr. GREEN. Mr. President, as chairman of the Committee on Foreign Relations, I wish to announce that the Senate has today received a list of 92 sundry nominations for appointment to and promotion or designation in the Foreign Service.

Notice is hereby given that the list will be eligible for consideration by the Committee on Foreign Relations at the expiration of 6 days, in accordance with the committee rule.

NOTICE CONCERNING CERTAIN NOMINATIONS BEFORE COMMITTEE ON THE JUDICIARY

Mr. EASTLAND. Mr. President, the following nominations have been received and are now pending before the Committee on the Judiciary:

Joseph F. Job, of New Jersey, to be United States marshal for the district of New Jersey for a term of 4 years. He is now serving in this office under an appointment which expired June 10, 1958.

Charles Swann Prescott, of Alabama, to be United States marshal for the middle district of Alabama for a term of 4 years—reappointment.

On behalf of the Committee on the Judiciary, notice is hereby given to all persons interested in these nominations to file with the committee, in writing, on or before Friday, June 27, 1958, any representations or objections they may wish to present concerning the above nominations, with a further statement whether it is their intention to appear at any hearings which may be scheduled.

85TH CONGRESS
2D SESSION

H. R. 13091

IN THE HOUSE OF REPRESENTATIVES

JUNE 24, 1958

Mr. HARRIS introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce

A BILL

To authorize the expenditure of funds through grants for support of scientific research and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at institutions of higher education or other nonprofit organizations, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make such grants, or to make contracts for the conduct of basic or applied scientific re-

search at institutions of higher education or other nonprofit organizations, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligaton to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

85TH CONGRESS
2D SESSION

H. R. 13091

A BILL

To authorize the expenditure of funds through grants for support of scientific research and for other purposes.

By Mr. HARRIS

JUNE 24, 1958
Referred to the Committee on Interstate and Foreign Commerce

July 30, 1958

11. APPROPRIATIONS. Received the conference report on H. R. 12948, the D. C. appropriation bill for 1959 (H. Rept. 2325). pp. 14321-22

12. SMALL BUSINESS. Conferees were appointed on S. 3651, to make equity capital and long-term credit more readily available to small business. Senate conferees have not been appointed. p. 14326

13. AREA REDEVELOPMENT. Rep. Siler urged enactment of S. 3683, to provide Federal aid to economically depressed areas. pp. 14326-27

SENATE

14. APPROPRIATIONS. Agreed to the conference report on H. R. 11574, the independent offices appropriation bill for 1959, agreed to certain House amendments, and voted, 44 to 39, to recede from an item in disagreement to include $589 million for the Civil Service Retirement and Disability Fund. Sen. Sparkman spoke against the elimination of $100,000 for HHFA farm housing research, and Sens. Saltonstall and Magnuson stated they would consider the matter next Jan. in the supplemental or regular independent offices appropriation bill (pp. 14246-7). This bill will now be sent to the President. pp. 14243-56

Passed, 71 to 0, with amendment H. R. 12738, the Defense Department Appropriation bill for 1959, and conferees were appointed (pp. 14258-9, 14261-87). Agreed to an amendment, applying generally to Government departments and agencies, to require reports to Congress in writing, following the close of each calendar quarter, of the amount of each budgetary reserve in effect at the end of such quarter and the purpose for which each such reserve was established. This was a modification, proposed by Sen. Hayden, of a committee amendment that had been reported on this subject (pp. 14264-5).

Passed without amendment H. J. Res. 672, to make temporary appropriations until Aug. 31, 1958, to various agencies until their regular 1959 appropriation bills are enacted. This measure will now be sent to the President. p. 14191

15. TRANSPORTATION. Both Houses agreed to the conference report on S. 3778, to strengthen the national transportation system. This bill will now be sent to the President. pp. 14205-8, 14326

16. AGRICULTURE AND FORESTRY COMMITTEE ordered reported the following bills:

Without amendment:

H. R. 6542, to authorize the conveyance of certain forest lands to Dayton, Wyo.;

H. R. 11800, to authorize the Secretary to sell a tract of land and buildings thereon under the jurisdiction of ARS to Clifton, N. J.;

S. 3333, to improve the insured loan program of FHA;

H. R. 12224, to prohibit the creation of an acreage history on peanuts after 1957 by those growing peanuts without an acreage allotment;

H. R. 12840, to provide a single acreage allotment for Va. sun-cured and Va. fire-cured tobaccos if farmers vote approval in a referendum;

S. 4151, to establish uniform provisions for the transfer of acreage allotments when the landowner is displaced by an agency having the right of eminent domain;

S. 3858, to authorize CCC to purchase flour and cornmeal for donation instead of having such products processed from its own stocks; and

H. Con. Res. 295, endorsing plans of a non-government group to establish a Hall of Fame for Agriculture.

With amendment:
S. 2142, to amend the Agricultural Marketing Agreement Act so as to extend restrictions on certain citrus fruits;
S. Res. 344, to authorize the committee to study marketing practices relating to loose and tied tobacco; and
H. R. 12126, to extend to wild animals the same prohibition against entry into the U. S. as domestic animals from any country where rinderpest or foot-and-mouth disease exists;
An original bill to extend the Mexican farm labor program for one year.
p. D758

17. WATERSHED PROJECTS. The Agriculture and Forestry Committee approved the following watershed projects: Adobe Creek, Buena Vista Creek, and Central Sonoma, Calif.; Upper Nanticoke River, Del.; Donaldson Creek, Ky.; Mud Creek, Nebr.; Peavine Mountain, Nev.; Indian Creek, Tenn. and Miss.; and Cook Creek, Wis. pp. D758-9

18. FORESTRY. Conferees were appointed on S. 3051, to provide for either private or Federal acquisition of that part of the Klamath Indian forest lands which must be sold. House conferees have not been appointed. pp. 14257-8

19. RESEARCH. The Government Operations Committee reported with amendments S. 4039 to authorize the head of any Government agency now making contracts for research to grant funds for the support of such research (S. Rept. 2044). p. 14186

20. PERSONNEL. The Post Office and Civil Service Committee reported with amendment H. R. 7710, to provide for the lump-sum payment of all accumulated and accrued annual leave of deceased employees (S. Rept. 2055). p. 14186

21. FISHERIES; EXTENSION. The Interstate and Foreign Commerce Committee reported with amendments S. 2973, to establish a fishery extension service in the Fish and Wildlife Service to carry out cooperative fishery extension work with the States (S. Rept. 2063). p. 14186

22. MINERALS. The Interior and Insular Affairs Committee reported with amendment S. 4146, to provide for incentive payments to minerals producers (S. Rept. 2057). p. 14186

23. FARM INCOME. Sen. Hruska discussed the July release of USDA "Farm Income Situation," showing the increase in farm income, and inserted 14 statements based on USDA statistics showing the upward trend in farm income and living standards. pp. 14199-200

24. ELECTRIFICATION. Sen. Neuberger criticized the alleged bias of Douglas McKay as Chairman of the International Joint Commission studying the position of the Federal government as to joint actions with Canada in developing the Columbia River Basin, asserted that his opposition to Federal power developments made him unsuitable for formulating the Federal position in this area, and inserted an editorial on the matter. pp. 14204-5

25. HUMANE SLAUGHTER. Sen. Allott stated that the humane slaughter bill, because of the discretion granted the Secretary for formulating regulations, was "one of the best, prime example of what legislation should not be." pp. 14190-1

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85TH CONGRESS, 2d Session | SENATE | REPORT No. 2044

EXPENDITURE OF FUNDS THROUGH GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH

JULY 30, 1958.—Ordered to be printed

Mr. HUMPHREY, from the Committee on Government Operations, submitted the following

REPORT

[To accompany S. 4039]

The Committee on Government Operations, to whom was referred the bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research, and for other purposes, having considered the same, report favorably thereon with amendments and recommend that the bill, as amended, do pass.

The amendments are as follows:

On page 1, line 5, before the word "institutions", insert the word "nonprofit".

On page 1, line 5, strike out the words "or other" and insert in lieu thereof the following: ", or at".

On page 1, line 6, before the words "is hereby authorized", strike out the comma and insert the following: "whose primary purpose is the conduct of scientific research,".

On page 1, line 10, strike out "such grants, or to make", and insert in lieu thereof "grants or".

On page 2, line 1, before the word "institutions", insert the word "nonprofit".

On page 2, line 1, strike out the words "or other" and insert in lieu thereof the following: ", or at".

On page 2, line 2, before the word "shall", strike out the comma and insert the following: "whose primary purpose is the conduct of scientific research,".

On page 2, following line 7, add the following new language:

> SEC. 3. Each agency or department of the Federal Government exercising authority granted by this Act shall make an annual report on or before June 30 of each year to the

Committees on Appropriations and the Committees on Government Operations of both House of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in section 1 of this Act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this Act.

The committee amendments contained in sections 1 and 2 of the bill were added in order to insure that the grant authority provided herein would be applicable only to nonprofit institutions of higher education and to organizations concerned primarily with the conduct of scientific research. The reports section was added in order to make certain that the Congress would be informed with respect to the amount and number of grants made and the institutions in whom title to equipment is vested.

Purpose

The purpose of this bill is to advance and promote the progress of scientific research in the United States and to provide for greater flexibility and economy in the administration of such research, by authorizing Federal Government departments and agencies engaged in the support of basic scientific research at institutions of higher education or other nonprofit organizations to (1) make grants for the support of such research; and (2) vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with such grant or contract funds provided for the support or conduct of such research.

S. 4039 would not authorize any new research programs or activities or increase Federal expenditures. The authority granted by its provisions would be entirely permissive in nature, leaving it up to each individual agency to exercise its discretion with regard to whether it uses the grant or contract procedure and whether it retains title to equipment purchased under the contract or grant.

Need for Legislation

Under existing law, all Federal agencies and departments, which are engaged in the support of basic scientific research, are authorized to support such activities by entering into contracts with colleges, universities, or other nonprofit organizations for the conduct of such research. Only three agencies—the National Science Foundation and the Departments of Agriculture and Health, Education, and Welfare—are now authorized to accomplish this work by means of grants as well as contracts. Furthermore, as these projects are completed, various problems arise concerning the disposition of the equipment used in connection with such research activities, title to which is retained by the Government.

It is reported that certain types of research may be accomplished more advantageously by means of the contract forms; whereas others are better accomplished by grants. It appears further that a considerable amount of expense and unnecessary labor results from the retention by the Government of title to equipment used in carrying out research projects due to the necessity for maintaining records,

and transporting and storing such property, which is often unsuitable for any other use.

This bill was submitted by Dr. Alan T. Waterman, Director of the National Science Foundation, in order to enable Federal agencies which do not have grant authority to exercise discretion as to the legal instrument to be used in the support of basic research at educational institutions or other nonprofit organizations, and as to whether it should retain title to equipment purchased under the contract or grant, or transfer it to the institution or organization which may be able to use it more productively.

The following data was transmitted by Dr. Waterman in support of this measure:

NATIONAL SCIENCE FOUNDATION,
Washington, D. C., June 18, 1958.

The Honorable RICHARD M. NIXON,
President of the Senate,
Washington, D. C.

MY DEAR MR. VICE PRESIDENT: The National Science Foundation, in accordance with its statutory authority to encourage the pursuit of national policies for the promotion of basic research and education in the sciences, herewith transmits a legislative proposal, together with an attached explanation, which would authorize agencies of the Federal Government engaged in support of basic scientific research at institutions of higher education or other nonprofit organizations, to make grants for the support of such basic scientific research, and to vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with grant or contract funds provided for the support or conduct of such research.

The Bureau of the Budget has advised us that it has no objection to the submission of this legislation.

Sincerely yours,

ALAN T. WATERMAN, *Director.*

1. USE OF GRANTS FOR THE FEDERAL SUPPORT OF BASIC SCIENTIFIC RESEARCH AT INSTITUTIONS OF HIGHER EDUCATION AND OTHER NONPROFIT ORGANIZATIONS

Nature of basic research

Basic research is that type of research which is directed toward increase of knowledge in science. It is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.

Present responsibilities of Federal agencies for the conduct and support of basic research

Section 4 of Executive Order 10521, dated March 14, 1954, states:

"SEC. 4. As now or hereafter authorized or permitted by law, the Foundation shall be increasingly responsible for providing support by the Federal Government for general-

purpose basic research through contracts and grants. The conduct and support by other Federal agencies of basic research in areas which are closely related to their missions is recognized as important and desirable, especially in response to current national needs, and shall continue."

Magnitude and scope of present Federal financing of basic research

Total obligations for basic research during fiscal year 1958 will probably fall somewhere in the range of $200 million to $250 million. This basic research will be carried on primarily in Federal laboratories, in research centers operated under contract for the Government, and within colleges and universities under grants and contracts from various Federal agencies. With respect to this third category, it is estimated that Federal obligations in the current fiscal year will be somewhere in the neighborhood of $100 million. While precise data are not available on this point, it would appear that around 50 to 60 percent of federally financed basic research at colleges and universities is supported by grant and 40 to 50 percent supported by contract. Agencies currently engaged in supporting basic research at colleges and universities include the Departments of Agriculture; Army, Navy, and Air Force; Health, Education, and Welfare; Interior; Commerce; Atomic Energy Commission; National Advisory Committee for Aeronautics; and the National Science Foundation. Of these, HEW, NSF, and Agriculture have authority to make grants; the others do not.

Advantages of the grant over the contract

Where the Government desires to engage the services of an educational or nonprofit organization for the conduct of a specific piece of research directed toward a specific problem, the use of the contract form is obviously in order. On the other hand, where it is the desire of the Government to stimulate and support fundamental research in a given field, with the perimeters of inquiry limited only by the curiosity and creativity of the scientific investigator, the use of the grant form has several marked advantages.

First, the psychological relationship between the recipient institution or individual and the Government is more in keeping with the concept of maximum freedom of action for the scientific investigator. Second, the problem is avoided of endeavoring to adapt detailed contract regulations designed primarily for the procurement of hardware to the support of creative, fundamental research. Third, advance payment of the grant can be made without the vouchering of expenditures and accompanying "progress reports" or other "proof of work"—both of which exercise a deadening effect upon the initiative of the scientist.

The accompanying bill is designed to enable agencies not now having such authority to exercise discretion as to the legal instrument to be used in the support of basic research at educational institutions or other nonprofit organizations.

The authority requested would be permissive not mandatory in character. If a particular undertaking were relatively narrow in scope, or if the agency for any reason desired to maintain a fairly close rein on the pursuit of the research, it could use the contract form. Conversely, if it were the agencies' desire in other cases to support fundamental research in a broad field, with full latitude for the choice of particular lines of inquiry, the grant instrument could be used.

2. TITLE TO EQUIPMENT

One of the most troublesome administrative problems involved in the Federal support of research at colleges and universities concerns the disposition of property and equipment to which the Government retains title. Although appendix C of the Armed Services Procurement Regulations issued in July 1952 had the effect of improving regulations previously in force, the present situation continues unsatisfactory from the viewpoints of both educational institutions and the Government. The time and expense involved in keeping records of equipment may often exceed the original value of the equipment. There is unnecessary variation in the records required by different agencies and needless duplication of records by universities (despite the fact that appendix C of ASPR assigns to the contractor the primary responsibility for recordkeeping). Much time and labor is frequently spent after termination of research contracts in the formal and often fruitless circulation throughout the Government of long lists of highly specialized equipment, particularly with respect to minor items of equipment. Furthermore, in many cases, it would be prohibitively costly to relocate major items of equipment back into a Government warehouse.

Generally, two reasons account for the retention of title by the Government to equipment obtained with Federal funds. One is of a legal character, agencies being unable to transfer title to Government property without further obligation to the Government in the absence of some tangible consideration; second is the feeling on the part of agencies that, conceivably, the Government might have need for the equipment at a different location after the termination of the research. In order to meet these two problems and to simultaneously protect the Government's interest, it is recommended that legislative authority be sought which would authorize Federal agencies supporting or contracting for research and development work at educational or nonprofit institutions to provide in the grants or contracts that title to equipment financed by the agency in connection with the research would rest with the institution without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate.

Hearings

Hearings on S. 4039 were held by the Subcommittee on Reorganization on June 25 and 26, 1958, in connection with hearings on a provision contained in title I of S. 3126, relative to the expansion of the Federal program for coordination of scientific information and documentation.

Appearing in support of S. 4039 were Dr. Alan T. Waterman, Director, National Science Foundation; Mr. Ben G. Huff, Director, Office of Research and Services, Office of Assistant Secretary of Defense (Research and Engineering); Dr. C. W. Shilling, Deputy Director, Division of Biology and Medicine, Atomic Energy Commission; Mr. Walter Williams, Under Secretary of Commerce; and Dr. Stanley Fracker, Assistant to the Administrator, Agricultural Research Service, Department of Agriculture. No witnesses appeared in opposition to the bill.

Dr. Waterman advised the subcommittee that S. 4039 was presented by the Foundation in accordance with its statutory authority to encourage the pursuit of national policies for the promotion of basic research and education in the sciences. He noted that the Foundation already possessed the authority which would be provided by the subject bill, but that the Foundation believed that the authority to use the grant mechanism and to fully dispose of property purchased with research funds provided by the Federal Government would be of great assistance to other agencies concerned with scientific research activities.

The balance of his testimony was, in general accord with the statement submitted in support of the measure, previously set forth in this report under the section entitled "Need for Legislation." He stressed the fact, however, that the authority granted by this bill would be permissive in nature, merely granting legislative authority to have the option of making grants or contracts for research, and that it would not authorize new research programs or increase Federal expenditures. In concluding his testimony, he pointed out that the subject matter of the pending bill had been considered by the Interdepartmental Committee on Scientific Research and Development, composed essentially of the directors of research in all of the Government agencies dealing with research and development, "and they are all most enthusiastic that this go forward."

On behalf of the Department of Defense, Mr. Ben G. Huff advised the subcommittee that the Department "heartily supports this proposed legislation."

He stated further that—

> The Department of Defense believes that a more liberal attitude in authorizing grants for the support of basic research would greatly stimulate and enhance these efforts. There is no doubt that institutions of higher education and other nonprofit organizations conducting basic and applied scientific research for the Department of Defense on contract will welcome the opportunity to obtain title to the equipment purchased with contract funds. * * * Furthermore, * * * the policy as proposed in the bill would eliminate the time, labor, and expense involved in keeping records of equipment and negotiations at the time of termination of research projects.

Dr. C. W. Shilling stated:

> As a representative of the Atomic Energy Commission, I am * * * happy to report our wholehearted support for S. 4039, which would authorize our agency to make grants as well as contracts for the support of basic scientific research at institutions of higher education and other nonprofit organizations.
>
> As you are aware, the AEC now has authority under existing law to make grants for the conduct of certain educational and training activities. We are utilizing this grant authority for the granting of money to institutions of higher education for the purpose of purchasing equipment to be used for the education and training programs in the area of special interest to the Atomic Energy Commission.
>
> To be eligible for these grants, the educational institution must meet certain prescribed requirements, which leads me to mention that a grant in our mind is not intended as an outright gift to the research institution. They would have to meet the same rigorous scientific standards now required for support by contract. But the grant is much more desirable from an administrative standpoint than a contract for support of basic research, as has been ably pointed out in the explanation of the draft bill before you and by the previous speakers.
>
> Because of its programatic nature, much of the research sponsored by the Atomic Energy Commission would continue to be handled by contract, but we would welcome the authority to use the grant method for support of basic research, that portion of our program which we are conducting in support of our programatic needs.
>
> We in the AEC also endorse the second section of the bill, which would permit us to allow our research contractors or grantees to retain title to the scientific equipment purchased to conduct the research we are sponsoring with them.
>
> Once again the compelling reasons for favoring this part of the bill have been clearly set forth, but let me say that such language would be very helpful to us not only in future grants or contracts but in profitably disposing of some of the equipment in university contracts now in force.
>
> In other words, we in the Atomic Energy Commission also wholeheartedly favor S. 4039 as an instrument which would make our program of research much more efficient and would make it easier and more profitable, and I think more economical in handling our research program.

Testifying in support of S. 4039, on behalf of the Department of Agriculture, Dr. Stanley Fracker stated that it would strengthen the Department's basic research activities and would supply it with authority it does not now have.

He stated further that—

> The explanation of this bill as published in the Congressional Record refers to the Department of Agriculture as already having authority to make grants to educational institutions and others for scientific work. I should explain

that the authority in the Department of Agriculture relates only to the administration of statutory grants, and that the Department does not have authority to make discretionary grants for specific projects and specific amounts such as is within the authority of, say, the National Institutes of Health. The Department does have authority to make research contracts and makes a number of them each year. Some of the contracts get quite closely into the field of basic research, where it is very difficult to describe precisely what the contractor is to do. It would accordingly be useful for the Department of Agriculture to participate in the authority that this bill carries, S. 4039, with respect to discretionary grants.

We would also agree with the comments made by the National Science Foundation on section 2 of bill 4039, which relates to the title to equipment and the advantages of making it possible in the discretion of the grantor agency for the grantee to retain equipment that was purchased under the grant.

The Bureau of the Budget did not appear at the hearings. However, by letter of July 1, 1958, the Bureau expressed its support of S. 4039, as well as that of agencies having responsibilities in the field of scientific research, as follows:

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D. C., July 1, 1958.

Hon. HUBERT M. HUMPHREY,
Chairman, Subcommittee on Government Reorganization,
Committee on Government Operations,
United States Senate, Washington, D. C.

MY DEAR SENATOR HUMPHREY: This is in response to your informal request for a statement regarding views of the various agencies respecting S. 4039, to authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

After the National Science Foundation submitted its original draft bill to the Bureau of the Budget, the following agencies were requested to comment: The Departments of Defense, Commerce, Agriculture, Interior, and Health, Education, and Welfare, and the Atomic Energy Commission and National Advisory Committee for Aeronautics.

All agencies listed submitted views on the proposed legislation. Several technical questions were raised by the agencies which were resolved through discussion with the National Science Foundation. These agencies have advised the Bureau of the Budget, either informally or in their views letters, that they favored enactment of legislation to authorize grants for basic research and to make provision for the disposition of equipment related to basic and applied research.

The Bureau believes that the enactment of S. 4039 would benefit the management of research programs in the Federal agencies and would also benefit relations between the Government and universities in the conduct of research under Federal sponsorship.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

Conclusion

It is the considered judgment of the committee that S. 4039 is a most meritorious measure which will promote the progress of scientific research in the United States. This measure will provide greater flexibility and economy in the conduct and administration of such research without authorizing any new projects or activities and without increasing Federal expenditures. It has the support of all of the agencies and departments of the executive branch which have scientific research responsibilities.

The committee urges favorable action on this bill.

○

Calendar No. 2090

85TH CONGRESS
2D SESSION

S. 4039

[Report No. 2044]

IN THE SENATE OF THE UNITED STATES

JUNE 20, 1958

Mr. HUMPHREY (by request) introduced the following bill; which was read twice and referred to the Committee on Government Operations

JULY 30, 1958

Reported by Mr. HUMPHREY, with amendments

[Omit the part struck through and insert the part printed in italic]

A BILL

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at *nonprofit* institutions of higher ~~education or other~~ *education, or at* nonprofit ~~organizations,~~ *organizations whose primary purpose is the conduct of scientific research,* is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make ~~such grants, or to make~~

grants or contracts for the conduct of basic or applied scientific research at *nonprofit* institutions of higher ~~education or other~~ *education, or at* nonprofit ~~organizations,~~ *organizations whose primary purpose is the conduct of scientific research,* shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this Act shall make an annual report on or before June 30th of each year to the Committees on Appropriations and to the Committees on Government Operations of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in section 1 of this Act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this Act.

Calendar No. 2090

85TH CONGRESS
2D SESSION

S. 4039

[Report No. 2044]

A BILL

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

By Mr. HUMPHREY

JUNE 20, 1958

Read twice and referred to the Committee on Government Operations

JULY 30, 1958

Reported with amendments

S. 4039

Aug. 4, 1958

The Interior and Insular Affairs Committee ordered reported without amendment S. 4009, to increase the amount authorized to be appropriated for the Washoe reclamation project, Nev. and Calif., and with amendment S. 3448, to permit the Secretary of the Interior to authorize increases in the 160-acre limitation on the Seedskadee Reclamation project. p. D789

The Interior and Insular Affairs Committee reported without amendment H. R. 13523, to authorize the construction and maintenance by Interior of the Fryingpan-Arkansas reclamation project (H. Rept. 2427). pp. 14768-69

12. WHEAT; CORN MEAL. Passed without amendment H. R. 13268, to authorize CCC to purchase flour and corn meal for donation instead of having such products processed from its own stocks. pp. 14691-92

13. DESERT-LAND ENTRIES. Passed with amendments S. 359, to permit desert land entries on disconnected tracts of land aggregating less than 320 acres and form a compact unit. p. 14696

14. TRANSPORTATION. Passed under suspension of the rules H. R. 8382, to provide for the licensing of independent foreign freight forwarders (pp. 14747-48); and H. R. 474, to repeal Sec. 217 of the Merchant Marine Act of 1936 relating to the coordination of the forwarding and servicing of water-borne export and import foreign commerce of the U. S. (p. 14748).

15. FRUITS AND NUTS. Voted 40 to 33 to suspend the rules and pass H. R. 11056, to amend the Agricultural Marketing Agreement Act so as to extend restrictions on certain imported citrus fruits, dried fruits, walnuts, and dates. At the request of Rep. McCormack further consideration of the bill was postponed until Wed., Aug. 6. pp. 14754-60

16. WATERSHEDS. Received from the Budget Bureau plans for works of improvement pertaining to the following watersheds: Furnace Brook-Middle River, Conn. and Mass.; Busseron, Ind., and Crooked Creek, Iowa; to Agriculture Committee. p. 14768

17. RADIO FREQUENCIES. The Interstate and Foreign Commerce Committee reported with amendments S. J. Res. 106, to establish a commission to investigate the utilization of the radio and television frequencies allocated to agencies and instrumentalities of the Federal Government (H. Rept. 2355). p. 14768

18. SALINE WATER. The Interior and Insular Affairs Committee ordered reported with amendment S. J. Res. 135, to provide for the construction of demonstration plants for the production, from saline waters, of water suitable for agricultural, industrial and consumptive uses. p. D789

19. MILITARY CONSTRUCTION. Conferees agreed to file a conference report on H. R. 13015, the military construction authorization bill. p. D790

20. PERSONNEL. Passed over, at the request of Rep. Ford, H. R. 1168, to restore the pay of officers or employees to the level of the grade held before downgrading in certain cases. p. 14684

SENATE

21. PRICE SUPPORTS. Sen. Proxmire criticized the cost of the present price support farm program and inserted an economic analysis of the cost of his bill, S. 2952, which concluded that it would be less expensive than the present program. pp. 14642-3

22. RESEARCH. Passed as reported S. 4039, to authorize the head of any Government agency now making contracts for research to grant funds for the support of such research. pp. 14623-4

23. PERSONNEL. Passed as reported H. R. 7710, to provide for the lump sum payment of all accumulated and accrued annual leave of deceased employees. p. 14626

24. MINERALS. At the request of Sen. Talmadge, passed over S. 4146, to provide for incentive payments for the production of certain minerals. p. 14626

The interior and Insular Affairs Committee reported without amendment S. Res. 225, to extend until Jan. 31, 1959, the time for filing a report on the study of strategic raw materials in the Western hemisphere (S. Rept. 2175). p. 14546

25. FISHERIES; EXTENSION SERVICE. Passed as reported S. 2973, to establish a fishery extension service in the Fish and Wildlife Service to carry out co-operative fishery extension work with the States. pp. 14627-8

26. FORESTRY. Passed without amendment the following bills:

S. 3682, to authorize the Secretary to convey certain national forest land in Ariz. to the Univ. of Ariz. p. 14629

H. R. 6038, to authorize transfers of land between the Sequoia National Forest and the Kings Canyon National Park, Calif. This bill will now be sent to the President. p. 14630

H. R. 6198, to authorize the transfer of not more than 10 acres of land from the Sequoia National Park to the Sequoia National Game Refuge in Sequoia National Forest, Calif. This bill will now be sent to the President. p. 14630

The Agriculture and Forestry Committee reported with amendment S. 4053, to extend the boundaries of Siskiyou National Forest (S. Rept. 2171). p. 14546

27. DEFENSE PRODUCTION. Began debate on S. 4162, to provide for the cancellation of certain uncollectible loans and operating losses under Title III of the Defense Production Act, to increase (in effect) the borrowing authority for the defense stockpile $300 million. pp. 14631-2, 14644-50

28. MONOPOLIES. At the request of Sen. Talmadge, passed over S. 11, to amend the Robinson-Patman Act with reference to equality of opportunity. p. 14618

29. WATER RESOURCES. At the request of Sen. Talmadge, passed over S. 3185, to promote fish and wildlife conservation by requiring prior approval by the Secretary of the Interior of licenses issued under the Federal Power Act. p. 14623

30. ADMINISTRATIVE ORDERS. The Judiciary Committee reported without amendment H. R. 6788, to authorize the abbreviation of the record on the review or enforcement of orders of administrative agencies by the courts of appeals and the review or enforcement of such orders on the original papers and to make uniform the laws relating thereto (S. Rept. 2129). p. 14545

31. TOBACCO. The Agriculture and Forestry Committee reported with amendment S. Res. 334, to direct the committee to study marketing practices relative to loose and tied tobacco (S. Rept. 2163); which was then referred to the Rules and Administration Committee. p. 14546

The Agriculture and Forestry Committee reported without amendment H. R. 12840, to provide a single acreage allotment for Va. sun-cured and Va. fire-cured tobaccos if farmers vote approval in a referendum (S. Rept. 2162) p. 14546

This proposed amendment would simply permit the use of the land for hospital purposes or other related health purposes. Certainly, the adoption of this amendment could not jeopardize the Veterans' Hospital installation, but could actually work to the benefit thereof.

In view of the fact that much work needs to be done on the proposed hospital project at Amarillo in order to comply with State laws in the creation of a hospital district, I urge that early action be taken on H. R. 5949.

Sincerely yours,

WALTER ROGERS,
Member of Congress.

Mr. TALMADGE. Mr. President, the amendments have been approved by the Committee on Government Operations. They merely permit the use of land for hospital or related health purposes.

The PRESIDING OFFICER. Without objection, the question is on agreeing, enbloc, to the amendments offered by the Senator from Georgia on behalf of the senior Senator from Texas [Mr. JOHNSON].

The amendments were agreed to.

The PRESIDING OFFICER. The question is on the engrossment of the amendments and third reading of the bill.

The amendments were ordered to be engrossed and the bill to be read a third time.

The bill was read the third time, and passed.

BILLS PASSED OVER

The bill (S. 3185) to promote the conservation of migratory fish and game by requiring certain approval by the Secretary of the Interior of licenses issued under the Federal Permit Act, was announced as next in order.

The PRESIDING OFFICER. Is there objection to the present consideration of the bill?

Mr. TALMADGE. I ask that the bill go over. It is not properly calendar material.

The PRESIDING OFFICER. Objection is heard. The bill will go over.

The bill (H. R. 13482) to amend the Atomic Energy Act of 1954, as amended, was announced as next in order.

The PRESIDING OFFICER. Is there objection to the present consideration of the bill?

Mr. CLARK. I ask that the bill go over. It is not calendar material.

The PRESIDING OFFICER. Objection is heard. The bill will go over.

SUPPORT OF SCIENTIFIC RESEARCH

The Senate proceeded to consider the bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research, and for other purposes, which had been reported from the Committee on Government Operations, with amendments, on page 1, at the beginning of line 5, to insert "nonprofit", in the same line, after the word "higher", to strike out "education or other" and insert "education, or at"; in line 6, after the word "nonprofit", to strike out "organizations" and insert "organizations whose primary purpose is the conduct of scientific research"; in line 11, after the word "make," to strike out "such grants, or to make" and insert "grants or"; on page 2, line 2, after the word "at", to insert "nonprofit", in the same line, after the word "higher", to strike out "education or other" and insert "education, or at"; in line 3, after the word "nonprofit", to strike out "organizations" and insert "organizations whose primary purpose is the conduct of scientific research", and, after line 10, to insert a new section, as follows:

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this act shall make an annual report on or before June 30 of each year to the Committees on Appropriations and to the Committees on Government Operations of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in section 1 of this act, the dollar amount of such grants, and the institutions in which title to equipment was vested pusuant to section 2 of this act.

So as to make the bill read:

Be it enacted, etc., That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make grants or contracts for the conduct of basic or applied scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this act shall make an annual report on or before June 30 of each year to the Committees on Appropriations and to the Committees on Government Operations of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in section 1 of this act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this act.

The amendments were agreed to.

The bill was ordered to be engrossed for a third reading, read the third time, and passed.

Mr. COOPER subsequently said: Mr. President, I wish to comment on Calendar 2090, Senate bill 4039, which has just been passed. The bill was introduced by the Senator from Minnesota [Mr. HUMPHREY] and was reported favorably by the Committee on Government Operations. I believe it is a very important bill, which deserves some comment.

The bill provides that all Federal agencies or departments which are now engaged in basic scientific research may henceforth, if the bill be passed by the House, support such basic research by grants as well as by contract. This is a very important matter.

Last week, when the Senate was debating the appropriation bill for the Department of Defense, I observed that the hearings on the bill disclosed that despite the fact that we are appropriating $41 billion for defense in fiscal 1959, only $46 million of that amount is to be devoted to basic research. That is about $1 out of every $1,000, or one-tenth of 1 percent for basic research.

I was also interested to note that the distinguished senior Senator from Colorado [Mr. ALLOTT] testified before the Committee on Appropriations, and urged that larger sums be appropriated for basic research.

A large amount—approximately $2,700,000,000—was appropriated for research and development. So it may appear to many that a large sum has been appropriated for research. But in fact, almost all of that amount was for applied research and for development—that is, for the application of basic research.

In the report on the bill which has just been passed, "basic research" is defined as follows:

Basic research is that type of research which is directed toward increase of knowledge in science. It is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.

The distinguished senior Senator from Colorado [Mr. ALLOTT] who is now presiding over the Senate, in his testimony before the Committee on Appropriations said:

Basic research, if it is truly basic, cannot relate itself to any definite end. Basic research is basic research, and it may contribute to the military or it may end up by contributing to medicine primarily.

Whether it be for our military needs or for the general advancement of knowledge and the progress of our Nation, basic research is essential. I am very glad the Senator from Minnesota introduced the bill that has now been passed by the Senate, and which would encourage additional support for basic scientific research.

I again call the attention of the Senate to the fact that out of the tremendous sum appropriated for the Department of Defense—$41 billion—only $46 million will be spent next year for basic research. If we are behind the Soviet Union today—in the field of weapons development and in many other fields, it is partly because we have not given sufficient attention and adequate sums to basic research. I think it is a great failing on the part of the Department of Defense and, I may say, of Congress, that this important subject has been neglected. I again commend the Senator from Minnesota for his forsight in introducing the bill which has now been passed by the Senate.

Mr. HRUSKA. Mr. President, will the Senator yield?

Mr. COOPER. I yield.

Mr. HRUSKA. Is it not true that the bill and the purpose which it seeks to subserve were recommended by the National Science Foundation and by gov-

ernmental agencies as a solid step forward in the direction which the Senator has indicated?

Mr. COOPER. That is true. The National Science Foundation recommended the measure.

CONVEYANCE OF CERTAIN PROPERTY TO THE CITY OF ROSEBURG, OREG.

The bill (S. 6995) to amend Public Law 883, 84th Congress, to provide for the conveyance of certain additional property of the United States to the city of Roseburg, Oreg., and for other purposes, was announced as next in order.

The PRESIDING OFFICER. Is there objection to the present consideration of the bill?

Mr. COOPER. I ask that the bill go over.

Mr. MORSE. Mr. President, I wish to say that it is with a sad heart that I must object to the consideration of the bill. It involves a piece of property which has been before the Senate off and on for some years. I have opposed the bill heretofore and shall continue to oppose it. In my opinion it violates the Morse formula, which I have cited many times since 1946 in objecting to any transfer of property, whether it be in my State or any other State, which violates the Morse formula. I have on previous occasions objected to the bill, and I shall again today. I do object.

The PRESIDING OFFICER. The bill will go over.

Mr. NEUBERGER. I should like to make a brief comment on the remarks of my distinguished senior colleague and to ask him a question.

First I should like the RECORD to show that the bill was introduced in the House by the distinguished Representative of the Fourth Congressional District, CHARLES O. PORTER. I introduced the companion bill in the Senate. I ask unanimous consent that my statement in behalf of the bill before the House Committee on Government Operations, together with certain documents, be printed in the RECORD at this point.

There being no objections, the letter and documents were ordered to be printed in the RECORD, as follows:

I appreciate the opportunity to present my statement in favor of H. R. 6995, a companion bill to S. 1915, which it was my privilege to introduce in the Senate on April 17, 1957.

If I may, I would like to give you a little history—first, a little history of legislative effort concerning the bills just referred to; second, a little history of the Lillie Lela Moore property and then I would like to report on the public response that accompanied the introduction of H. R. 6995 and S. 1915.

On February 29, 1956, I introduced a bill for conveyance of certain properties in Roseburg, Oreg., to that city to be used in the public interest. The bill, with certain amendments, was enacted and became Public Law 833, 84th Congress. Briefly, it provided for the dwelling house, known as the Lillie Lela Moore house, "together with furniture, personal effects, and jewelry stored in said dwelling house or elsewhere," to be placed in the hands of the Douglas County Historical Society. The bill also required the removal of the house from the land "at no cost to the United States."

S. 3316, with the modifying amendments with which it was enacted, failed to accomplish certain objects which the bill, as originally drafted, would have achieved. These objectives would, generally speaking, be realized with the enactment of the Porter-Neuberger measures. My bill of 1956 would have conveyed the three lots and the house to the city. As enacted the Federal Government retained title to the lots, including the one on which the dwelling house stands, and removal of the house was, of course, required. I might add, by way of bringing events up to date, that the General Services Administration recently sold on bid 2 of the 3 lots and the bill passed by the House and the Senate Government Operations Committees would convey the lots on which the old home stands to the city of Roseburg for operation of the Douglas County Historical Society.

Perhaps I should explain the interest of the Douglas County Historical Society in what is known as the Lillie Moore home. Over 100 years ago, even before Oregon became a State, a young man from Maine built a home for his bride, Alice Gaylord. The home was representative of that stability and permanence befitting a community conscious of its sudden emergence from its frontier days and its pioneer origins. It was proudly graced with many of the refinements of mid-Victorian living, which had been shipped around the Horn by the young groom, Mr. Moore. I have been told how the daughter, Lillie Lela Moore, who passed on at an advanced age, recognized that her childhood home had historical significance and should be preserved as a historical museum. May I say parenthetically that this home was never desecrated with gadgets and contrivances of a modern era. There are no electric lights, no central heating—it stands today, truly a museum piece—completely representative of a prosperous, middle-class home of the 1850's.

I have received letters which tell how Miss Lillie Moore sat with her neighbors and enumerated pieces of furniture within her home that should be included in some future historical exhibit. These former neighbors and friends tell me her will, drawn in 1927, evidenced her intent to see her property serve educational and public purposes. This will placed the property in what was to her the safe, secure hands of the Federal Government, and there was a very understandable reason why this was done.

It has been explained quite simply by those who were her close friends and confidantes just why Lillie Moore made the designation she did. Shortly before she made her will, Lillie Lela Moore had a misunderstanding with certain local officials, presumably over the price of a piece of land the authorities were endeavoring to get for public use. Rightly or wrongly, Lillie Moore resented what she believed was an attempt to acquire her land at a substantially lower figure than was paid for adjoining property. She drew her will to prevent, she thought, the misuse of her property and the neglect of her dreams. Not versed in the law, and not realizing the importance of explicitness, she failed to spell out in legal terms what she had frequently voiced to her friends. From the disclosures of her most intimate friends, it can be seen that this will in no way altered her frequently expressed plan of providing a setting for a museum which would catch and hold for posterity some feeling and evidence of a period receding quickly into its storied past. There is no reason to think that in her mind there was any doubt that her poverty would serve these historic ends. Throwing light on this matter and as corroborative material, Mr. Chairman, I have copies of affidavits I have received.

I have mentioned the response elicited by the introduction of H. R. 6995 and S. 1915. I would like to quote from some of the letters I have received. Mrs. Mabel K. Jaeger, of Roseburg, said in a letter: "Her intentions were clearly evident in all the papers in the house that she desired to use the proceeds of her property to establish a historical museum for this portion of Oregon."

Mrs. M. K. Bleakman, corresponding secretary of the Roseburg Junior Women's Club, wrote officially in support of S. 1915 as follows: "It is a commonly known fact that Lillie Moore desired to leave her money and property to found this museum. Due to faulty legal counsel, the will was made to the United States Government, making it impossible to create the museum as Miss Moore intended."

The Canyonville Lions Club, through their secretary, James Hancock, expressed officially the club viewpoint thus: "Douglas County has played a considerable part in the history of Oregon. Two of Oregon's most outstanding pioneers, Jesse Applegate and Gen. Joseph Lane, chose this particular section in which to make their homes and rear their families.

Mrs. Edith Ackert, of Riddle, writes: "Surely we would not be playing fair if we obstruct her intentions of using it for a museum." Pearl Lawson, another resident of Riddle, said in a letter to the editor of the Roseburg daily: "Since the Moore family played an active part in the early history of Roseburg, and Lillie Moore had cherished the hope of her personal possessions being placed in a museum, it seems proper that her desires be fulfilled."

In a letter the director of the Oregon Historical Society, Thomas Vaughn, said: "The State society considers the Lillie Moore home to be of unusual architectural interest. We are confident it was the implicit feeling of Lillie Moore that this home, her property, and personal effects could be most advantageously used in preserving and enlarging upon this pioneer setting in an area to which her family had contributed so much."

Guy Lutz, superintendent of schools at Oakland, Oreg., sees the enactment of the proposed legislation as a great boon to school children who would benefit educationally. The mayor of Oakland, William Brislain, reiterates the fact that Miss Moore wanted her property to serve her own community.

Mrs. Katherine Lockwood affirms the cultural benefits enactment would assure. C. P. Hunter, chairman of the California Farm Bureau, refers to "her verbally expressed desires." And Mrs. Eva Love Watts, a granddaughter of Lincoln's friend, Joseph Lane, first Territorial Governor of Oregon, knew Lillie Moore personally. She says: "It was her family's wish their property be used for a museum, and Lillie tried to carry out their wishes. Somehow her will was not properly made, and her intention was not recognized."

Let me mention in conclusion that construction people are dubious about the structures ability to withstand a moving of the sort required in Public Law 883 of the 85th Congress, a fact emphasized in the excellent report on the bill issued by the Senate Government Operations Committee.

STATE OF OREGON,
County of Douglas, ss:

I, being first duly sworn, upon my oath, depose and say that I personally knew Lillie Moore for over 30 years. The last time I visited her, in company with my cousin, Winnifred Mosher, a few months before her death, and at the time bedfast, she permitted us to go through the house and look at the furnishings, kept the same as her parents had left them. She told us that she had everything marked, and ready for the house

S. 4039

AN ACT

85TH CONGRESS
2D SESSION

S. 4039

IN THE HOUSE OF REPRESENTATIVES

AUGUST 5, 1958

Referred to the Committee on Interstate and Foreign Commerce

AN ACT

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, engaged in making contracts for basic scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make grants or contracts for the

conduct of basic or applied scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this Act shall make an annual report on or before June 30th of each year to the Committees on Appropriations and to the Committees on Government Operations of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in section 1 of this Act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this Act.

Passed the Senate August 4, 1958.

Attest: FELTON M. JOHNSTON,

Secretary.

85TH CONGRESS
2D SESSION

S. 4039

AN ACT

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

AUGUST 5, 1958

Referred to the Committee on Interstate and Foreign Commerce

AN ACT

Digest of CONGRESSIONAL PROCEEDINGS
OF INTEREST TO THE DEPARTMENT OF AGRICULTURE

OFFICE OF BUDGET AND FINANCE
(For Department Staff Only)

Issued August 14, 1958
For actions of August 13, 1958
85th-2d, No. 139

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HIGHLIGHTS: House cleared for President: Humane slaughter bill; USDA insured loans bill. Rep. McCormack announced farm bill to be considered today (Aug. 14). Senate committee reported supplemental appropriation bill (to be considered today, Aug. 14). Several Senators urged passage of cotton, rice, and wool legislation. Senate passed education bill. Sen. Proxmire introduced and discussed bill to extend marketing orders to producers of fresh fruits and vegetables. Sen. Symington submitted and discussed measure to freeze cotton and rice acreage allotments.

HOUSE

1. FARM PROGRAM. Rep. McCormack announced that S. 4071, the farm bill, would be considered today, Aug. 14, under suspension of the rules. (p. 16013) Rep. Cooley inserted a copy of the bill to be considered, which he stated would be an amendment to the bill as passed by the Senate. (pp. 16026-29)

2. FARM LOANS. Passed under suspension of the rules S. 3333, to facilitate the insurance of farm ownership and soil and water conservation loans. This bill will now be sent to the President. (pp. 16029-30) See Digest 137 for provisions of the bill.

3. HUMANE SLAUGHTER. Concurred in the Senate amendments to H. R. 8308, to provide for the humane slaughter of livestock. This bill will now be sent to the President. (p. 16029) See Digest 128 for a summary of the Senate amendments.

4. EXCISE TAXES. Received the conference report on H. R. 7125, to make technical changes in the Federal excise tax laws (H. Rept. 2596). House conferees were appointed earlier in the day. Senate conferees have been appointed. pp. 15956, 16053-56

5. ROADS. Concurred in the Senate amendment to H. R. 12776, to revise, codify, an enact into law, title 23 of the U. S. Code entitled "Highways." This bill wil now be sent to the President. pp. 15998-99

6. FOOD ADDITIVES. Passed under suspension of the rules H. R. 13254, to amend the Federal Food, Drug, and Cosmetic Act so as to prohibit the use in food of addi tives which have not been adequately tested to establish their safety. pp. ,16013-26

7. LANDS. Concurred in the Senate amendment to H. R. 4635, to provide for the settlement and entry of public lands in Alaska containing coal, oil, or gas under Sec. 10 of the act of May 14, 1898. This bill will now be sent to the President. p. 16034

8. HOUSING. Rep. Mack urged passage of S. 4035, the omnibus housing bill, before Congress adjourns. p. 16036

9. TRANSPORTATION. Rep. Tollefson referred to certain foreign criticism of the cargo preference legislation, which requires that at least 50 percent of U. S. shipments under the foreign aid program be shipped in American vessels, and stated that "I am convinced that Congress will not relax its views with respect to" this shipping requirement. p. 16036

10. SCHOOL LUNCHES. The District of Columbia Committee reported with amendment S. 1764, to authorize payment of the cost of free lunches for needy children in the D. C. public schools (H. Rept. 2588). p. 16056

11. MINERALS; WATER RESOURCES. Agreed to the Senate amendment to H. R. 11123, to authorize Interior to perform surveys, investigations, and research in geology biology, minerals and water resources. This bill will now be sent to the President. p. 16034

12. RESEARCH. The Interstate and Foreign Commerce Committee ordered reported S. 4039, to authorize the head of any Government agency now making contracts for research to grant funds for the support of such research. p. D844

13. INFORMATION. Received a report from the Government Operations Committee "pertaining to information from Federal departments and agencies" (H. Rept. 2578). p. 16056

14. RECLAMATION. Received from Interior a report on Red Willow Dam and Reservoir and associated works, and Frenchman-Cambridge division, Missouri River Basin project, Nebr. p. 16056

SENATE

15. FARM PROGRAM. Sen. McClellan urged the passage of legislation this session to prevent reductions in cotton and rice acreage. Sen. Stennis concurred in his opposition to adjourning until the farm legislation is passed. Sen. Johnson stated: "Too many people in this field have been too adamant," and urged that a compromise farm bill be worked out. Sens. Johnston, Jordan, and Hill agreed that farm legislation is necessary. pp. 15844-5

Sens. Mansfield, Barrett, Allott, and Thye urged the passage of the Wool Act extension bill, and stated that the woolgrowers would be endangered if the law were not extended this session. pp. 15856-8

Aug. 15, 1958

HOUSE - August 15

12. AREA REDEVELOPMENT. Passed with amendments, 176 to 130, S. 3683, to establish an effective program to alleviate contiions of substantial unemployment in economically depressed areas. (pp. 16342-408) Rejected, 79 to 106, an amendment, in the nature of a substitute for the bill, by Rep. Fenton. Rep. Fenton explained that his proposed substitute amendment was the same as his bill H. R. 5468, "which I introduced for the administration on February 28, 1957". (pp. 16389-94) Rejected, 170 to 188, a motion by Rep. Hiestand to recommit the bill to the Banking and Currency Committee. (p. 16408)

13. ONION FUTURES. Agreed to the conference report on H. R. 376, to prohibit trading in onion futures. This bill will now be sent to the President. p. 16335

14. DISASTER LOANS. The Agriculture Committee reported with amendment S. 304, to provide for a specific contribution by State governments to the cost of feed or seed furnished to farmers, ranchers, or stockmen in disaster areas (H. Rept. 2650). p. 16429

15. CROP INSURANCE. The Agriculture Committee reported with amendment H. R. 13262, to eliminate the prohibition against crop insurance being made available to certain counties which do not have wide participation in the program (H. Rept. 2646). p. 16429

16. FORESTRY. The Agriculture Committee reported without amendment S. 3741, to provide regular national forest status to most lands under the jurisdiction of the Forest Service (H. Rept. 2638). p. 16429

17. RESEARCH. The Interstate and Foreign Commerce Committee reported with amendment S. 4039, to authorize the head of any Government agency now making contracts for research to grant funds for the support of such research (H. Rept. 2640); ~~and H. R. 11257, to make various amendments regarding administration of the National Science Foundation (H. Rept. 2642). p. 16429~~

18. MILITARY CONSTRUCTION. Conferees were appointed on H. R. 13489, military construction appropriation bill for 1959. p. 16320

19. PALM OIL; TAXATION. Passed as reported H. R. 10239, to amend the Internal Revenue Code of 1954 so as to exempt palm oils from tax during the first domestic processing until June 30, 1960. p. 16332

20. BUTTER; CHEESE. Passed as reported S. 2006, to amend the Internal Revenue Code of 1954 so as to relieve the Surgeon General of the Army and Navy from sitting with the Secretary of Agriculture on appeals boards to decide appeals from the decision of the Secretary of the Treasury on cases involving deleterious substances in butter or oleomargarine or in any substance used in the manufacture of so-called filled cheese. pp. 16332-3

21. WATER RESOURCES. Passed as reported S. 4021, to establish the U. S. Study Commission on the Savannah, Altahama, St. Marys, Apalachicola-Chattahoochee, and Perdidio-Escambia River Basins. The House amendment replaces the Alabama-Coosa River Basin with the Perdidio-Escambia River Basin. pp. 16335-7

22. FARM PROGRAM. Rep. Hoffman objected to Rep. Cooley's request for unanimous consent to agree to Senate's request for a conference on S. 4071, the farm bill. p. 16410

23. MINERALS. The Rules Committee reported a resolution for consideration of S. 4036, to provide production payments to stabilize the production of certain minerals. pp. 16411-2, 16429

24. EDUCATION. The Education and Labor Committee reported without amendment H. R. 13241, to provide assistance to the States for area vocational education programs (H. Rept. 2649). p. 16429

25. RECLAMATION. The Rules Committee reported a resolution for consideration of H. R. 13523, to authorize the construction, operation, and maintenance by the Secretary of the Interior of the Fryingpan-Arkansas reclamation project. pp. 16412, 16429

26. PERSONNEL. Conferees were appointed on S. 25, to specify the effective date upon which changes in pay of wage-board employees shall begin following the start of a survey. Senate conferees have been appointed. p. 16412

Conferees were appointed on H. R. 7710, to provide for the lump sum payment of all accumulated and accrued annual leave of deceased employees. Senate conferees have not been appointed. p. 16412

27. SMALL BUSINESS. Passed without amendment S. 3224, to improve opportunities f small business concerns to obtain a fair proportion of Government purchases and contracts. This bill will now be sent to the President. p. 16414

28. HOUSING. Rep. Hiestand inserted a summary of H. R. 13776, the proposed Housing Act of 1958. pp. 16414-5

29. PROPERTY; LEASES. The Government Operations Committee ordered reported S. 3142 to extend GSA authority to lease out Federal building sites until needed for construction purposes. p. D860

The Government Operations Committee adopted a report, "Importation of Foreign Excess Property." p. D860

30. LEGISLATIVE PROGRAM. Rep. McCormack announced the following legislative program: Mon., Aug. 18: Consent Calendar; and the following under suspension of the rules: S. 4035, housing bill; H. R. 13067, food stamp bill; S. 4039, increased funds for research; and H. R. 13241, vocational education bill; Tues and remainder of the week: Private Calendar; S. 1764, D. C. school lunch bi and S. 4036, minerals stabilization payments bill. pp. 16909-10

31. ADJOURNED until Mon., Aug. 18. p. 16428

SENATE - August 16

32. FARM PROGRAM. Agreed to a motion by Sen. Ellender requesting the House to return S. 4071, the farm bill, to the Senate for considering agreeing to the House amendments to the bill. Sens. Mundt and Thye criticized this action. pp. 16508, 16510-11

33. FOREIGN TRADE; SURPLUS COMMODITIES. Conferees were appointed on S. 3420, to extend Public Law 480. House conferees have not been appointed. pp. 16520-21

34. FORESTRY. Sen. Jackson criticized Federal timber sales policies, stating that "I am disappointed that the Forest Service has not met its timber sales goals, that "it is high time that the secretariat for the Department of Agriculture and the bureaucracy of the Budget Bureau to take off their blinders and look to the goals that must be achieved," and inserted tables on timber sales administration and management, and Forest Service appropriated funds for the past several years. pp. 16497-99

85TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 2640

AUTHORIZING THE EXPENDITURE OF FUNDS THROUGH GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH

AUGUST 15, 1958.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. WILLIAMS of Mississippi, from the Committee on Interstate and Foreign Commerce, submitted the following

REPORT

[To accompany S. 4039]

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research, and for other purposes, having considered the same, report favorably thereon with amendments and recommend that the bill as amended do pass.

The amendments are as follows:

On the first page, line 4, strike out "engaged in making" and insert in lieu thereof "authorized to enter into".

Page 2, lines 13 and 14, strike out "Committees on Appropriations and to the Committees on Government Operations" and insert in lieu thereof "appropriate committees".

Page 2, line 17, strike out "section 1" and insert in lieu thereof "the first section".

PURPOSE OF LEGISLATION

The purpose of this bill is to authorize those Federal Government departments and agencies authorized to enter into contracts for basic scientific research at institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, to (1) make grants for the support of such research; and (2) vest in such institutions or organizations, without further obligation to the Government, title to equipment purchased with such grant or contract funds.

S. 4039 would not authorize any new research programs or activities or increase Federal expenditures. The authority granted by its provisions would be entirely permissive in nature, leaving it up to each individual agency to exercise its discretion with regard to whether it

uses the grant or contract procedure and whether it retains title to equipment purchased under the contract or grant.

Need for Legislation

Under existing law, all Federal agencies and departments, which are engaged in the support of basic scientific research, are authorized to support such activities by entering into contracts with colleges, universities, or other scientific nonprofit organizations for the conduct of such research. Only three agencies—the National Science Foundation and the Departments of Agriculture and Health, Education, and Welfare—are now authorized to accomplish this work by means of grants as well as contracts. Furthermore, as these projects are completed, various problems arise concerning the disposition of the equipment used in connection with such research activities, title to which is retained by the Government.

It is reported that certain types of research may be accomplished more advantageously by means of contracts, whereas others are better accomplished by grants. It appears further that a considerable amount of expense and unnecessary labor results from the retention by the Government of title to equipment used in carrying out research projects due to the necessity for maintaining records, and transporting and storing such property, which is often unsuitable for any other use.

This bill was submitted by Dr. Alan T. Waterman, Director of the National Science Foundation. The changes made by the House amendments are merely of a clarifying nature.

Hearings

Hearings were held on July 24, 1958, by the Subcommittee on Health and Science on H. R. 13091 which is a companion bill to S. 4039.

Appearing in support of this legislation were Dr. Alan T. Waterman, Director, National Science Foundation; Mr. Ben G. Huff, Director, Office of Research and Services, Office of Assistant Secretary of Defense (Research and Engineering); Dr. C. W. Shilling, Deputy Director, Division of Biology and Medicine, Atomic Energy Commission; and Dr. Stanley B. Fracker, Assistant to the Administrator, Agricultural Research Service, Department of Agriculture. No witnesses appeared in opposition to the bill.

Conclusion

It is the considered judgment of the committee that S. 4039 is a most meritorious measure which will promote the progress of scientific research in the United States. This measure will provide greater flexibility and economy in the conduct and administration of such research without authorizing any new projects or activities and without increasing Federal expenditures. It has the support of all of the agencies and departments of the executive branch which have scientific research responsibilities.

The committee urges favorable action on this bill.

Agency Reports

The explanation of this legislation submitted by the National Science Foundation is as follows:

1. USE OF GRANTS FOR THE FEDERAL SUPPORT OF BASIC SCIENTIFIC RESEARCH AT INSTITUTIONS OF HIGHER EDUCATION AND OTHER NONPROFIT ORGANIZATIONS

Nature of basic research

Basic research is that type of research which is directed toward increase of knowledge in science. It is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.

Present responsibilities of Federal agencies for the conduct and support of basic research

Section 4 of Executive Order 10521, dated March 14, 1954, states:

> SEC. 4. As now or hereafter authorized or permitted by law, the Foundation shall be increasingly responsible for providing support by the Federal Government for general-purpose basic research through contracts and grants. The conduct and support by other Federal agencies of basic research in areas which are closely related to their missions is recognized as important and desirable, especially in response to current national needs, and shall continue.

Magnitude and scope of present Federal financing of basic research

Total obligations for basic research during fiscal year 1958 will probably fall somewhere in the range of $200 million to $250 million. This basic research will be carried on primarily in Federal laboratories, in research centers operated under contract for the Government, and and within colleges and universities under grants and contracts from various Federal agencies. With respect to this third category, it is estimated that Federal obligations in the current fiscal year will be somewhere in the neighborhood of $100 million. While precise data are not available on this point, it would appear that around 50 to 60 percent of federally financed basic research at colleges and universities is supported by grant and 40 to 50 percent supported by contract. Agencies currently engaged in supporting basic research at colleges and universities include the Departments of Agriculture; Army, Navy, and Air Force; Health, Education, and Welfare; Interior; Commerce; Atomic Energy Commission; National Advisory Committee for Aeronautics; and the National Science Foundation. Of these, HEW, NSF, and Agriculture have authority to make grants; the others do not.

Advantages of the grant over the contract

Where the Government desires to engage the services of an educational or nonprofit organization for the conduct of a specific piece of research directed toward a specific problem, the use of the contract form is obviously in order. On the other hand, where it is the desire of the Government to stimulate and support fundamental research in a given field, with the perimeters of inquiry limited only by the curiosity and creativity of the scientific investigator, the use of the grant form has several marked advantages.

First, the psychological relationship between the recipient institution or individual and the Government is more in keeping with the concept of maximum freedom of action for the scientific investigator. Second, the problem is avoided of endeavoring to adapt detailed contract regulations designed primarily for the procurement of hardware to the support of creative, fundamental research. Third, advance payment of the grant can be made without the vouchering of expenditures and accompanying "progress reports" or other "proof of work"—both of which exercise a deadening effect upon the initiative of the scientist.

The accompanying bill is designed to enable agencies not now having such authority to exercise discretion as to the legal instrument to be used in the support of basic research at educational institutions or other nonprofit organizations. The authority requested would be permissive, not mandatory, in character. If a particular undertaking were relatively narrow in scope, or if the agency for any reason desired to maintain a fairly close rein on the pursuit of the research, it could use the contract form. Conversely, if it were the agencies' desire in other cases to support fundamental research in a broad field, with full latitude for the choice of particular lines of inquiry, the grant instrument could be used.

2. TITLE TO EQUIPMENT

One of the most troublesome administrative problems involved in the Federal support of research at colleges and universities concerns the disposition of property and equipment to which the Government retains title. Although appendix C of the Armed Services Procurement Regulations issued in July 1952 had the effect of improving regulations previously in force, the present situation continues unsatisfactory from the viewpoints of both educational institutions and the Government. The time and expense involved in keeping records of equipment may often exceed the original value of the equipment. There is unnecessary variation in the records required by different agencies and needless duplication of records by universities (despite the fact that appendix C of ASPR assigns to the contractor the primary responsibility for recordkeeping). Much time and labor is frequently spent after termination of research contracts in the formal and often fruitless circulation throughout the Government of long lists of highly specialized equipment, particularly with respect to minor items of equipment. Furthermore, in many cases, it would be prohibitively costly to relocate major items of equipment back into a Government warehouse.

Generally, two reasons account for the retention of title by the Government to equipment obtained with Federal funds. One is of a legal character, agencies being unable to transfer title to Government property without further obligation to the Government in the absence of some tangible consideration; second is the feeling on the part of agencies that, conceivably, the Government might have need for the equipment at a different location after the termination of the research. In order to meet these two problems and to simultaneously protect the Government's interest, it is recommended that legislative authority be sought which would authorize Federal agencies support-

ing or contracting for research and development work at educational or nonprofit institutions to provide in the grants or contracts that title to equipment financed by the agency in connection with the research would rest with the institution without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate.

○

Union Calendar No. 1106

85TH CONGRESS
2D SESSION

S. 4039

[Report No. 2640]

IN THE HOUSE OF REPRESENTATIVES

AUGUST 5, 1958

Referred to the Committee on Interstate and Foreign Commerce

AUGUST 15, 1958

Reported with amendments, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Omit the part struck through and insert the part printed in italic]

AN ACT

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, ~~engaged in making~~ *authorized to enter into* contracts for basic scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make grants or contracts for the

conduct of basic or applied scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this Act shall make an annual report on or before June 30th of each year to the ~~Committees on Appropriations and to the Committees on Government Operations~~ *appropriate committees* of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in ~~section 1~~ *the first section* of this Act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this Act.

Passed the Senate August 4, 1958.

Attest: FELTON M. JOHNSTON,

Secretary.

Union Calendar No. 1106

85TH CONGRESS
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S. 4039

AN ACT

"The conferees are also aware of the problem having to do with the exporting of wheat from Canada and other friendly nations. Accordingly, it has directed the Secretary to endeavor to cooperate with these countries with respect to commodities governed by formal, multilateral international marketing agreements to which the United States is a party. As a practical thing, the international wheat agreements are the only ones affected by this language and even though it might temporarily reduce by some 40 percent the ability of the United States to dispose of wheat through barter, it was the sense of the conferees that mutually agreeable plans should be worked out with Canada and other signatories of appropriate agreements.

"Furthermore, the conferees have recognized the economic and security factors in accepting domestically processed materials in lieu of ore. While the present law is silent on the subject, for a long time barter contracts were made for domestically processed materials. For some reason this program was stopped. It was the sense of the conferees that American labor and management should be permitted to participate in the barter program. Accordingly the bill specifically authorizes the Secretary to permit the processing of foreign ores by domestic processors. The House provision that alloys produced from domestic ores could be taken was eliminated from the bill.

"As we have stated above, the substantive changes in the law, while significant, are not nearly as significant as the fundamental fact that the Congress has felt it necessary to enact legislation to require performance of a program which it has previously established by law. This bill is designed to reinstate a barter program of at least the magnitude followed prior to the restrictive regulations issued by the Secretary of Agriculture. Not only will the assets and resources of our country be improved through this program, but there will be substantial savings in storage and depreciation costs, and the value of the materials taken in exchange for the commodities will increase as world supplies diminish."

2. DISASTER LOANS. Passed with amendment S. 304, to provide for a specific contribution by State governments to the cost of feed or seed furnished to farmers, ranchers, or stockmen in disaster areas. Rep. Cooley explained that as passed by the Senate the bill "provided that the States' participation would be to the extent of not less than 25 percent or more than 50 percent" and that the bill as amended by the House "provides that the participation shall be not in excess of 10 per centum, as the Secretary of Agriculture shall determine to be equitable of that part of the cost, including transportation of such feed or seed which is not paid by the recipients thereof." p. 17679

3. APPROPRIATIONS. Passed under suspension of the rules H. R. 13856, the independent offices appropriation bill for 1959. The bill deletes the $589 million item for the civil service retirement fund to which the President objected when he vetoed the original appropriation bill for these agencies. The bill was reported earlier in the day by the Appropriations Committee (H. Rept. 2689). pp. 17631, 17634-6, 17715

Received the conference report on H. R. 13489, the military construction appropriation bill for 1959 (H. Rept. 2699). pp. 17666-7, 17715

4. PERSONNEL. Agreed to the conference report on S. 1411, to give agencies discretion in suspending or retaining on duty Federal employees prior to security hearings. (pp. 17636-7) See Digest 146 for provisions of this bill.

Both Houses received and agreed to the conference report on S. 25, to specify the effective date upon which changes in pay of wage-board employees shall begin following the start of a survey (H. Rept. 2691). (pp. 17590, 17637-8, 17715) This bill will now be sent to the President.

Agreed to the conference report on H.R. 7710, to provide for the lump-sum payment of all accumulated and accrued leave of certain deceased employees. (pp. 17638-9) This bill will now be sent to the President.

5. RESEARCH. Passed under suspension of the rules S. 4039, to authorize the head of any Government agency now making contracts for research to grant funds for the support of such research. (pp. 17656-7) The Senate later concurred in the House amendments to this bill. (p. 17599) This bill will now be sent to the President.

6. TEXTILE LABELING. Both Houses received and agreed to the conference report on H. R. 469, to protect producers and consumers against misbranding and false advertising of the fiber content of textile fiber products (H. Rept. 2695). (pp. 17589-90, 17680-1, 17715) This bill will now be sent to the President.

7. LIVESTOCK DISEASES. Concurred in the Senate amendments to H. R. 12126, to extend to wild animals the same prohibition against entry into the U. S. as domestic animals from any country where rinderpest or foot-and-mouth disease exists. (p. 17685) This bill will now be sent to the President.

8. GRAZING PERMITS. Rep. Dingell stated that he objected to enactment of S. 3754, to permit the exchange of lands between Interior and the Navajo Indians, because of a provision in the bill providing for the compensation of owners of grazing permits on public land for the termination of their permits. p. 17696

9. SURPLUS COMMODITIES. Received from this Department the annual report of the Secretary on the orderly liquidation of commodities held by CCC and on programs to expand agricultural markets, pursuant to Public Law 540, 84th Congress. p. 17715

10. LEGISLATIVE PROGRAM. Rep. Albert announced that the Consent Calendar and Private Calendar would be called Sat., Aug. 23. p. 17685

SENATE - August 22

11. MEATPACKERS. Passed without amendment H. R. 9020, to transfer certain functions under the Packers and Stockyards Act from this Department to the Federal Trade Commission. (pp. 17599-600) This bill will now be sent to the President.

12. AREA REDEVELOPMENT. Concurred in the House amendments to S. 3683, to establish a program to alleviate conditions of substantial unemployment or underemployment in certain economically depressed areas. This bill will now be sent to the President. pp. 17601-4

Sen. Douglas explained the House amendments as follows: "The major amendments of the House were as follows:

"First, the House in accordance with its general insistence upon keeping the added check of the appropriation procedure upon such financing programs, amended the proposed industrial and rural area loan funds to an authorization for appropriations for funds for such loans;

"Second, the House deleted the Senate provision (sec. 7) for a $100 million loan fund for public facilities to aid in attracting private enterprises to these areas;

"Third, the House deleted a Senate provision (sec. 17) for the payment of retraining payments to persons not entitled to unemployment compensation, who are receiving training for a new job.

"Other changes made by the House included: (a) a prohibition against any public facility grant that would compete with an existing private utility; (b) a requirement that each recipient of assistance keep prescribed records, subject to review by the Commissioner and the Comptroller General; (c) a revision of the wording in the provision in respect to plant relocation; (d)

This bill was passed by the other body and for that reason, in order to expedite action in the House, was reported out of the committee rather than my companion bill, H. R. 13627, or Mr. Fogarty's bill, H. R. 13124, Mr. Forand's bill, H. R. 12796, or Mr. Hagen's bill, H. R. 13315, all of which were pending before the committee.

The desperate need for this legislation arises from a recent great, destructive, natural disaster caused by long-continued, severe earthquakes accompanying the sustained eruption of the volcano of Pico Gorda, which for a long period belched forth smoke, fumes, ashes, and lava upon the homes of more than 5,000 helpless victims on the island of Fayal in the Azores.

The stricken area had to be evacuated by these thousands of people fleeing from the fury of the poisonous fumes, suffocating smoke, and molten lava spreading over the countryside.

Most of the population of Fayal poured into Horta, the main seaport, seeking means of escape to other islands. The Portuguese Navy and hundreds of small fishing boats carried thousands of women, children, and aged and helpless people to adjacent islands in the vicinity where they might take temporary refuge from the natural holocaust.

This tragic event was the occasion for great suffering and hardship for these bewildered, unfortunate people, who were compelled to flee their homes, leaving their meager belongings behind them, and who are now homeless and dependent on charitable assistance, support, food, clothing, and shelter from relief agencies.

These people are thus displaced from their homes and native hearths, are escapees from a great disaster and refugees in other places where they are unable to support themselves and cannot find any means of providing livelihood for their families.

This bill permits admission to this country of a small, limited number of these afflicted people. There are precedents for this action, and these people are especially deserving, not only because they are pitiable victims of natural tragedy, but also because they are a good, loyal, God-fearing people whose kinsfolk and relatives in this country are among our very best citizens.

I have many Portuguese people in my district, and there are many of them who are residing in my great State. These people are of highest quality as loyal citizens. They are a noble component of our great American amalgam of citizenship—devoted, industrious, and patriotic in war and peace.

In the name of humanity, and in the interests of justice and equity, I ask compassion and help for this afflicted group and most earnestly urge my esteemed colleagues to pass this worthy bill.

This bill contains ample safeguards controlling the screening of the proposed refugees, and we may be assured that no unworthy persons will be admitted under its provisions and operation.

I can testify from my own experience that the Congress will never regret, but will always be proud, that it authorized the admission of these outstanding, loyal people to the United States. When encouragement, humane assistance, and opportunity take the place of a trembling earth and a searing lava covering their lands and homes, extinguishing their life's work and humble possessions, these people, like their fellow countrymen before them, will embrace their adopted country with love, devotion, and unswerving loyalty. Let us pass this bill by a smashing, and emphatic vote.

Mr. HAGEN. Mr. Speaker, will the gentleman yield?

Mr. WALTER. I yield.

Mr. HAGEN. Mr. Speaker, I wish to commend the chairman of the subcommittee who has so expeditiously and efficiently produced the bill before you. I am the author of a House bill which is identical with S. 3942, to permit the nonquota entry into the United States of a maximum of 1,500 families from the Azores Islands who are distressed by reason of a series of natural calamities.

The calamities I refer to are the volcanic eruptions near the island of Fayal in the Azores which commenced on September 27, 1957, accompanied by earthquakes. Subsequent repetitions occurred on November 4, 6, and 18, and December 18, 1957, and March 18, 1958. Following introduction of my bill a further eruption of Capelinhos volcano occurred on August 18, 1958. These eruptions and earthquakes were accompanied by extensive property damage on the nearly island which destroyed the livelihood of numerous residents of such island and created the necessity for this legislation. One thousand five hundred is estimated to be a reasonable number to afford relief. It should be noted that the Azores Islands are extremely beautiful islands, but they are definitely overpopulated in terms of the resources available compared to the number of persons resident thereon. I am advised that they fall within the Portuguese quota and that that quota only amounts to 428 persons annually.

This country's immigration policy contemplates over-quota admissions where it can be demonstrated that first, an emergency need for such relief exists; second, the aliens affected are, as a group, of an assimilable and compatible character; third, their admission into the United States will not jeopardize internal security and may prospectively enhance the national interest and national welfare; and fourth, such temporary immigration programs will be beneficial to the conduct of this Nation's foreign relations.

It would be my considered judgment that the Portuguese admissions provided for by this bill meet all of these tests in a superlative fashion. As I have indicated, the disaster has occurred and the first criterion is therefore met. The meeting of the other criteria involves the character of our relationships with the Portuguese Government and the quality of the people who will be admitted.

We have enjoyed extremely friendly relationships with the Portuguese Government. During World War II and since that time they have permitted us the use of the Azores Islands as an intermediate point in the long-air journey across the Atlantic. The quality of the Portuguese people is beyond question. I can attest personally to this fact because I have large numbers of people in my district who are either immigrants from the Azores Islands or the descendents of such immigrants. Almost without exception they are persons of extremely good character and accomplishment. They subscribe to the principles of our Government and economic institutions. They are industrious. They have a love of learning. They conform generally to all of the ideals of our society. I know that this act of humanity which we are about to undertake will be well received not only in those areas of this country which have an interest in matters of this kind but also in the Republic of Portugal.

Parenthetically, I should state that the natural disaster which occasions this aspect of this legislation was extremely well-reported in a recent issue of the National Geographic magazine.

I am certain that the same considerations apply with respect to the admissions of Dutch people from the Indonesian area referred to in section 3 of the Senate bill as amended by the House Committee of the Judiciary. I will leave discussion of this aspect of the bill to persons more qualified than I to deal with such distress situation which is outside the scope of the bill, H. R. 13315, which I introduced. I would respectfully urge immediate passage of this legislation without any substantial argument or dissent.

(Mr. McFALL (at the request of Mr. HAGEN) was given permission to extend his remarks at this point.)

[Mr. McFALL addressed the House. His remarks will appear hereafter in the Appendix.]

(Mr. SISK (at the request of Mr. HAGEN) was given permission to extend his remarks at this point.)

[Mr. SISK addressed the House. His remarks will appear hereafter in the Appendix.]

Mr. BOLAND. Mr. Speaker, will the gentleman yield?

Mr. WALTER. I yield.

Mr. BOLAND. Mr. Speaker, I support and will vote for this bill sponsored by the distinguished junior Senator from Rhode Island, Senator JOHN O. PASTORE, and the distinguished junior Senator from my State of Massachusetts, Senator JOHN F. KENNEDY. This legislation will make available 1,500 special nonquota immigrant visas for issuance to certain distressed aliens in the Azores Islands.

These people of Portuguese descent were made homeless when the volcano of Pico Gorda erupted on the Island of Fayal in the Azores and caused almost continuous earthquakes and destruction.

Many of these tragedy victims have relatives in New England communities who can assist them and offer them new hope in starting life over again in America. These New Englanders of Portuguese extraction have been good and

loyal citizens of the United States and have contributed greatly to American culture. Their Portuguese relatives who have suffered so much since their homes were destroyed in the Azores will make equal contributions to our great country if we pass this bill and allow them to come to our shores.

Mr. Speaker, unfortunately this is the only bill that will come before us in this session of Congress to allow immigrants to enter the United States. I had hoped that in this 2d session of the 85th Congress that the Immigration and Nationality Act would be amended. Bills which were filed my myself, H. R. 93 and H. R. 4086, and bills filed by many other Members of this House and Members of the Senate provided for a much more realistic approach to the present problem. For instance, under the present act only 438 quota immigrants can be admitted annually to the United States from Portugal, only 308 from Greece, only 5,645 from Italy, and only 6,488 from Poland. Why? Because the quotas are based on the 1920 census. Section 201 (a) of Public Law 414, 82d Congress, authorizes one-sixth of 1 percent of the 1920 census of Americans of foreign extraction as the basis for the issuance of immigrant visas. The lowest quota is 100, but southern European countries such as Portugal, Italy, and Greece have very low quotas because there were very few Americans in 1920, comparatively speaking, who were descendants of the Portuguese, the Italians, and the Greeks.

Mr. Speaker, I hope the 86th Congress will face the immigration problem realistically. The act needs to be amended and the national quotas must be based on the 1950 census, not the 1920 census.

Mr. LANE. Mr. Speaker, will the gentleman yield?

Mr. WALTER. I yield.

Mr. LANE. Mr. Speaker, I rise in support of this bill. I supported it in the Committee on the Judiciary, and I am hopeful that it will be approved by the House without any undue delay.

The purpose of this bill, Mr. Speaker, is to authorize the issuance of 1,500 special nonquota immigrant visas to certain citizens of Portugal who have been displaced from their homes in the Azores Islands as a result of earthquakes and volcanic eruptions, which have occurred on several occasions this year. These acts of nature have destroyed hundreds of homes and more than 5,000 people have been evacuated from the islands. These people are desperately seeking means of escape to other islands, and the number amounts to almost 25,000 people. As we know them, they are good, kindly, sincere, and upstanding people, many of whom have their relations in our United States and are our best citizens.

Under the provisions of this bill, out of these thousands that have been made homeless through no fault of their own and with no haven of refuge, we will admit 1,500 hoping that other countries will take a selfsame interest and admit the rest of these immigrants to their countries.

I am satisfied in my own mind that the admission of 1,500 of these special nonquota immigrants will not interfere in the least bit in the economy of this country, since I know that their countless relations and friends will provide homes and adequately support them. I sincerely hope that the opportunity will be presented to allow them to establish themselves here in the United States since they deserve a helping hand from the people of this Nation.

As I stated previously, as a member of the House Committee on the Judiciary, I favored this legislation, and I join with my colleagues on the committee with the hope that the House will support this legislation.

(Mr. LANE asked and was given permission to revise and extend his remarks.)

(Mr. FOGARTY (at the request of Mr. WALTER) was given permission to extend his remarks at this point.)

Mr. FOGARTY. Mr. Speaker, it is most gratifying to see that the Congress of the United States has acted promptly on the legislation under which a helping hand will be extended to a sizable group of the people of the Azores Islands who have suffered fear and destruction of their property caused by the series of volcanic eruptions that took place in the Azores Islands between September 1957 and March 1958.

Congress has once more taken humanitarian action where such action was most needed. But, the Congress has actually done more than to open the doors to the United States for a hardy group of Portuguese islanders. In acting on the immigration bill permitting the entry of 1,500 families from the Azores Islands, the Congress has actually recognized the exceptionally high qualities of character, the resourcefulness, patriotism, and civic qualities of the Americans of Portuguese descent, many of whom live in the States of Rhode Island and Massachusetts.

The immigration program authorized by the Congress will extend until June 30, 1960, and it is, therefore, of prime importance that friends and relatives of the immigrants from the Azores Islands whose entry has now been authorized, endeavor without delay to find for the new arrivals suitable places to live so that they will quickly become a part and parcel of the splendid community of the Americans of Portuguese descent in this country.

(Mr. FORAND (at the request of Mr. WALTER) was given permission to extend his remarks at this point.)

Mr. FORAND. Mr. Speaker, the people of the Fayal Islands, in the Azores, have been seriously affected by a series of earthquakes that have taken many lives, left thousands homeless, separated families, and scattered the members of these families to various parts of Portugal in search of shelter.

Many are homeless and penniless. Their future is a most discouraging one.

Many of these displaced persons have relatives and friends in my home State of Rhode Island who are not only willing, but anxious, to provide them with a home and a future.

I am glad that, despite the fact that President Eisenhower has turned down my request that he use his emergency powers to permit some of these people to come to the United States, Congress is taking steps by the enactment of this bill to allow 1,500 of these people to come here to join their loved ones.

I introduced in the House early last June, a bill, H. R. 12796, but as the Senate has acted on Senator PASTORE's bill first, I am glad to support this bill and urge all my colleagues to vote for it.

Enactment of this legislation will not only show to the world that we in America are ever ready and willing to help people in need, but it is, above all, a humanitarian act.

The SPEAKER. The question is on suspending the rules and passing the bill as amended.

The question was taken; and (two-thirds having voted in favor thereof) the rules were suspended and the bill was passed.

A motion to reconsider was laid on the table.

The title of the bill was amended to read: "A bill for the relief of certain distressed aliens."

CORRECTION OF ROLLCALL

Mr. McDONOUGH. Mr. Speaker, I ask unanimous consent that rollcall 191, on the bill S. 3335 be corrected. I am recorded as voting "no." I voted "aye."

The SPEAKER. Without objection the permanent RECORD and Journal will be corrected accordingly.

There was no objection.

GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH

Mr. HARRIS. Mr. Speaker, I move to suspend the rules and pass the bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research, and for other purposes, as amended.

The Clerk read the bill as follows:

Be it enacted, etc., That the head of each agency of the Federal Government, authorized to enter into contracts for basic scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research.

SEC. 2. Authority to make grants or contracts for the conduct of basic or applied scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

SEC. 3. Each agency or department of the Federal Government exercising authority granted by this act shall make an annual report on or before June 30th of each year to the appropriate committees of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority

provided in the first section of this act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this act.

The SPEAKER. Is a second demanded? If not, the Chair will put the question.

(Mr. HARRIS asked and was given permission to extend his remarks at this point in the RECORD.)

Mr. HARRIS. Mr. Speaker, the purpose of this legislation is to authorize any Federal agency, which is now authorized to enter into contracts for the conduct of basic research, to make grants for these same purposes. Thus, the agencies could proceed in their discretion by contract or grant to meet the needs of individual situations. Grants or contracts would be made for basic scientific research at nonprofit institutions of higher education or to nonprofit organizations whose primary purpose is the conduct of scientific research.

In addition, the legislation would authorize these agencies to vest in such institutions or organizations, on such terms or conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

The Subcommittee on Health and Science held hearings on this legislation, in the course of which testimony was received from Departments of Defense and Agriculture, the National Science Foundation, and the Atomic Energy Commission. It was pointed out that in many instances grants for the purpose of scientific research are more appropriate than contracts and that the equipment purchased with grant or contract funds is frequently so specialized that it is of no value to the Federal Government, but could fill a very useful function if left with the research institutions or organizations. It was stressed that the cost of bookkeeping to the Federal Government in many instances exceeded the value of such property to the Federal Government. Each of the agency witnesses testifying stressed that this authority would be used only where transfer of title to the equipment would not involve any additional cost to the Government and under these circumstances the committee feels that this legislation would further scientific research programs in which the Federal Government and educational institutions are interested.

The SPEAKER. The question is on suspending the rules and passing the bill.

The question was taken; and (two-thirds having voted in favor thereof) the rules were suspended and the bill was passed.

A motion to reconsider was laid on the table.

PATENT OFFICE BOARD OF APPEALS

Mr. WILLIS. Mr. Speaker, I move to suspend the rules and pass the bill (S. 1864) to authorize an increase in the membership of the Board of Appeals of the Patent Office; to provide increased salaries for certain officers and employees of the Patent Office; and for other purposes.

The Clerk read the bill, as follows:

Be it enacted, etc., That (a) the first sentence of the first paragraph of section 3 of title 35 of the United States Code is amended by striking out the word "nine" and inserting in lieu thereof the words "not more than fifteen."

(b) Such section is amended by inserting therein, immediately after the first paragraph thereof, the following new paragraph:

"The annual rate of compensation of the Commissioner shall be $20,000."

SEC. 2. Section 7 of title 35 of the United States Code is amended by adding at the end thereof the following new sentence: "Such designated examiners-in-chief may be compensated at the established rate for the positions in which they are temporarily serving: *Provided,* That at the end of the period for which designated their rate of compensation shall be adjusted to what it would have been had such designation not been made."

The SPEAKER. Is a second demanded?

Mr. KEATING. Mr. Speaker, I demand a second.

The SPEAKER. Without objection, a second will be considered as ordered.

There was no objection.

Mr. WILLIS. Mr. Speaker, this bill authorizes an increase from "nine" to "not more than fifteen" in the membership of the Board of Appeals of the Patent Office. It also provides a salary increase for the Commissioner of Patents.

The Patent Office, of course, is one of the real business offices of the Government. In that office there are some 1,000 examiners of patents who process as much as 7,000 patents per year.

This bill would increase the membership of the Board of Appeals to "not more than fifteen" in order that they may be enabled more expeditiously to examine and pass upon the patents channeled to them by these thousand examiners.

Mr. GROSS. Mr. Speaker, will the gentleman yield?

Mr. WILLIS. I yield to the gentleman from Iowa.

Mr. GROSS. Do I understand this bill is not approved by the Department of Commerce?

Mr. WILLIS. Initially there was some frowning on it, but it has been cleared.

Mr. GROSS. Does it provide any supergrade jobs?

Mr. WILLIS. No. The bill as amended deletes that. I might say it satisfies the House Committee on Post Office and Civil Service.

Mr. GROSS. I thank the gentleman.

Mr. KEATING. Mr. Speaker, I yield myself 5 minutes.

(Mr. KEATING asked and was given permission to revise and extend his remarks.)

Mr. KEATING. Mr. Speaker, S. 1864 will give much-needed relief to the Board of Appeals of the Patent Office. At the present time this Board is laboring under a backlog of over 7,000 pending cases. The result is that in some instances it requires several years to process patent applications. This period of delay is inexcusable and must be alleviated.

There is no evidence that this delay is due to inefficiency on the part of the present members of the Board of Appeals or the Commissioner of Patents. On the contrary, the statistics show that they have labored hard to dispose of a steadily increasing number of appeals. In the last fiscal year, for example, they disposed of almost 1,000 more cases than were disposed of in fiscal 1950. Even so, the backlog continues to mount.

S. 1864 would increase the number of members on the Board of Appeals from 9 to not more than 15. It would also increase the compensation of the Commissioner to $20,000 per year.

This bill has the strong support of the Secretary of Commerce, the Commissioner of Patents and the entire patent bar. I know of no opposition to it from any responsible source.

I am satisfied with the bill in its present form and urge its favorable consideration by the House.

Mr. LIBONATI. Mr. Speaker, this legislation (S. 1864) provides for an increase in the membership of the Board of Appeals of the Patent Office and an increase in salaries for certain officers and employees.

The witnesses in support of this legislation gave pertinent testimony as to the necessity of these changes—Robert C. Watson, United States Commissioner of Patents; Leo P. McCann, Chairman, United States Board of Patent Appeals; and Sam W. Kinsley, Personnel Director, United States Patent Office. These expert witnesses averred that the legislation would be beneficial both to business and industry and would result in speeding the final determination of the matters on the appeal calendar. A substantial increase in the salary features will attract competent and experienced personnel—as well as interest candidates to the lesser classifications for the pursuit of a career. The loss of trained personnel on raids by industry and law firms have resulted from low salaries in the upper bracket positions.

The freedom of selection of top experts by the Director will be the direct result of these increases.

The increase of the Board from 9 to 15 members will facilitate the work to the point that the present backlog of cases, appeals pending, amount to 2,000 workload and at the current end 5,000 case workload—either awaiting hearing or decisions. There are 2,000 other cases which are not ready for hearing or decision. Thus nearly 8,000 cases presently represent workload. So we can realize the great importance of the Bureau of Patents as a functioning unit of government. There were 77,000 applications for patents this year. These applications are assigned to one of the 67 examining divisions, consisting of a principal examiner, an assistant and a considerable number of examiner assistants who study the nature of disclosure of the applications, making searches to ascertain whether or not the applicant's contribution to arts is sufficiently important to warrant the issue of a patent.

The issues resulting between the applicant and the examiner through a series of hearings and attempts by amendments to satisfy the objections or determinations of the examiner. Upon

his final rejection of the application—an appellate procedure has been provided.

An appeal may be taken to the Board of Appeals. It is the only appellant tribunal of the entire Patent Office upon the question of patentability of inventions.

The examiners and assistant examiners are ex officio members of the Board but seldom function to decide cases—although in important cases they do.

The Commissioner appoints the members of the Board of Appeals when vacancies occur (he actually recommends the individual to the Secretary of Commerce). The Secretary of Commerce recommends to the President in the usual manner. The President issues a certificate to the permanent members of the Board of Appeals, (now number 9 members) as his appointees. As well as the Commissioner and Assistant Commissioner.

The designated members as referred to in this bill are those of primary grade or higher who are assigned to the Board for duty from time to time as needed. There are 10 such designated presently, who are sitting with the 9 regular members to handle the heavy influx of appeals.

The 8,000 appeals now pending are a real challenge.

Members, three in number, sit as a panel, hearing both oral and written argument. The panel studies the brief and arguments, rendering its decision. No more than one designated member can sit on a panel. One writes the decision—speaks with the second, then submits to the third person on the panel. This takes a great deal of time with much detail and extended delays. They have the last word—appeals are then taken to the Court of Customs and Patent Appeals and by suit de nova can be taken to the District Court of the United States for the District of Columbia.

This is a difficult work and the reputation of the Board must enjoy the highest reputation for personal integrity and judicial honesty in an office of first importance in the economy of the Nation. It enjoys the highest kind of confidences and secrets. The finest legal minds of international reputation practice before this tribunal.

Delay of final decision generally for 4 years, holds up plans for the building up of a new industry or the expansion of facilities for added production—meaning new employment not only to those in the parent industry but the related trades—including building industries, raw material and transportation expansion for added services.

The correspondence that I received from outstanding lawyers specializing in this field of law have been most revealing as to the need of this legislation. Listed strongly for this legislation were the law firm of Attorneys Merriam, Lorch & Smith, of Chicago Ill.; the Patent Law Association of Chicago, John A. Marzall, president; also attorneys, firm of Olson, Meckenburger, von Holst, Pendleton & Newman, of the Chicago bar.

The present determination of appeals board decisions averages 3,000 cases per year. Some appeals are withdrawn or the appellant and the examiner arrive at a decision, not requiring a decision.

In 1957, 2,500 cases were dismissed and 2,800 were decided. In 1956, 3,400 were dismissed and 2,300 were decided.

If each group of 3 panels determine about 500 case appeals per year, an average 1,000 cases would be decided by the increase of 2 panels—increase from 9 to 15.

These men require a high degree of administrative, legal, scientific—that is, engineering—ability and skill. These attributes must be combined in the talents of one individual. The salaries are important, especially in a system where the individual has reached the high position as member of the Board. These salaries are fixed in accordance with the Position Classification Act of 1949, a salary bill which covers the normal career in civil service salary—not an executive employee's salary. This bill will give prestige and security to those in the system to seek a career in the Patent Office. It will alleviate the problems of employment caused by applicants who accept employment with the specific intention of leaving after a period of training.

This bill gives the opportunity in the Patent Office to men, well trained, to remain in the service of the Government, aspiring to a career of honor with justice, with opportunity for his family to live with dignity and a feeling of enjoying a position of security.

Now—after training them—we lose them, but these higher salaries under the Classification Act will now be under the Commissioner to fix the annual rates of basic compensation for examiners in chief, subject to the approval of the Department of Commerce and of the Civil Service Commission.

The SPEAKER. The question is on suspending the rules and passing the bill.

The question was taken; and (two-thirds having voted in favor thereof) the rules were suspended and the bill was passed.

AUTHORIZING APPROPRIATIONS FOR CONTINUING CONSTRUCTION OF THE RAMA ROAD IN NICARAGUA

Mr. FALLON. Mr. Speaker, I move to suspend the rules and pass the bill (S. 3712) to authorize appropriations for continuing the construction of the Rama Road in Nicaragua.

The Clerk read as follows:

Be it enacted, etc., That there is hereby authorized to be appropriated to the Department of State, in addition to the sums heretofore authorized, the sum of $4 million, to be available until expended, for discharging the United States obligations under the applicable agreement with the Government of Nicaragua: *Provided,* That the survey and construction work shall be under the general supervision of the Secretary of Commerce: *Provided further,* That funds appropriated pursuant to this authorization shall not be available for expenditure except under the conditions set forth in section 5 of the Federal-Aid Highway Act of 1952 (66 Stat. 160), with respect to the authorization contained in that section.

The SPEAKER. Is a second demanded?

Mr. GROSS. Mr. Speaker, I demand a second.

Mr. FALLON. Mr. Speaker, I ask unanimous consent that a second be considered as ordered.

The SPEAKER. Is there objection to the request of the gentleman from Maryland?

There was no objection.

Mr. FALLON. Mr. Speaker, this bill authorizes an additional $4 million for the completion of the Rama Road which is being constructed from San Bonita to Rama. Under executive agreement, this work was started back in 1944, but due to the increased cost of materials and construction, it will cost $16 million instead of the estimated $12 million. There is remaining to be completed 40 miles, of which out of the prior authorizations they have the necessary funds to complete 20, and the $4 million that is requested here today will complete the remaining 20 miles and construct a large bridge.

We had before the Committee on Public Works representatives of the Bureau of Roads who informed us of the necessity for the $4 million to complete the road due to the additional cost of material and labor. The committee also had representatives of the Department of State who told us of the necessity to complete this road so that we live up to an agreement we made with Nicaragua. They also pointed out that at this time it is necessary that we keep the agreement because of the good will that is so necessary with our neighbors to the south.

Mr. Speaker, it was thought by the members of the committee that this legislation is necessary at this time and will do a very big job in public relations and good will.

Mr. GROSS. Mr. Speaker, I yield myself 3 minutes.

Mr. Speaker, I take this time to ask the gentleman from Maryland [Mr. FALLON] a question or two.

Was this bill reported unanimously by the gentleman's committee?

Mr. FALLON. There was 1 vote recorded against it. I think the vote was 30 to 1.

Mr. GROSS. Have we not had a similar bill before us year after year, and in amounts of $4 million or $5 million, and has it not been stated on the floor each time that would be the end of this request?

Mr. FALLON. I do not think in this case, I will say to the gentleman. The estimated cost at the beginning was in the neighborhood of $12 million. What we have done is to give it to them piecemeal over a period of years. Now we are at a stage where it can be completed within the next 2 years. But it is necessary, due to the increased cost of materials and labor, to get the additional money.

Mr. GROSS. Will the gentleman please state again what this road has cost us so far?

Mr. FALLON. So far there has been authorized $12 million, of which I think

H. R. 13173, introduced by the majority leader of the other House, Mr. McCORMACK.

As I understand, the administration has no opposition to the bill, according to Mr. Stam, counsel of the Committee on Finance. I believe the Treasury Department recognizes that the Internal Revenue Code should be amended to adjust an inequity which has grown out of an apparent inadvertence on the part of Congress at the time of the preparation and adoption of the Internal Revenue Code. The amendment is directed toward claims for refund which arise out of the renegotiation proceedings. There are plants in the State of Minnesota which are affected. I have a letter indicating the nature of one of the problems which have arisen as a result of the inequity in our present tax laws on the subject of renegotiation and the refunds which have accrued under such renegotiation. I shall read a paragraph from the letter from one company which is affected. It states:

> The allocation by the Board to X Co. of excessive profits of approximately $1,600,000 results in its having an operating loss for the year and consequently a net operating loss carryback to the year 1952. This would ordinarily give rise to a claim for refund for overpayment of tax in 1952, but by this late date, under existing law, the statute of limitations has run on the right to obtain such refund and the net operating loss carryback is worthless.

In other words, under present tax law there is what is called an operating loss carryback provision, which can be utilized to make adjustments when renegotiation board decisions have resulted in a substantial operating loss.

In this particular instance it means a difference in tax credit of many thousands of dollars for the one company I have mentioned. This is only one of many such instances. It is something which, it seems to me, should be corrected.

I know the argument can be made, "Well, let us do it next year." That may be a very good suggestion. But each year that we put off these matters we apply the old maxim: "Justice delayed is justice denied." It becomes ever more true.

So, since the other House has passed the bill, I believe unanimously, and since it was reported by the House Committee on Ways and Means unanimously, and there seems to be no adverse report on the part of the administration, the Bureau of the Budget, the Treasury, or the Internal Revenue Service, it seems to me it is desirable and proper to include this amendment in the bill before the Senate, the extension of the Renegotiation Act.

I feel certain there would be no objection in the House, because this is a House bill, which has been prepared in the form of an amendment to a Senate bill. Therefore, I ask that the amendment be adopted.

Mr. BYRD. I do not wish to prejudice the amendment offered by the Senator from Minnesota, but I hope he will not press too hard to place it in the bill. My objection is that the amendment is retroactive. It opens up closed cases. It goes back to 1953. If we go back to 1953 to open up such cases, then, it seems to me, we should go back to the beginning of the Renegotiation Act, which was about 1941. Why stop at 1953?

As a member of the Committee on Finance, I have always been very careful to consider any proposed retroactive legislation which will open up closed cases. If that is done in one case, it will have to be done in others. I can see no justification for going back to 1953, because the Renegotiation Act first became effective in 1941. Cases can be found in 1952, 1950, and 1945.

The Committee on Finance will be glad to give consideration to the proposed legislation when Congress next convenes, but I hope such a provision will not be included in the present bill. This is not a tax bill; it relates to the extending of the Renegotiation Act for a period of 6 months. I certainly am opposed to including a retroactive feature without full hearings having first been held by the committee.

Mr. HUMPHREY. Mr. President, I appreciate the views of the Senator from Virginia. I know he is sympathetic to the general purposes of this particular proposal. Rather than have the proposal prejudiced by an adverse vote, which I am afraid might result because of our great respect for the views of the Senator from Virginia on technical matters, I shall urge that the chairman of the committee give me assurance now that in the next Congress, with the reintroduction of this particular measure, prompt consideration will be given to it, consideration which, I trust, will result in favorable action.

Mr. BYRD. I shall be glad to give that assurance.

Mr. HUMPHREY. The Senator from Virginia gives me that assurance. On that basis, I withdraw my amendment. I appreciate the courtesy of the Senator from Virginia in giving me this assurance and consideration. I wanted to get the matter before the Senate, because I think we have a just case.

The PRESIDING OFFICER. The bill is open to amendment. If there be no amendment to be proposed, the question is on the third reading and passage of the bill.

The bill (H. R. 11479) was ordered to a third reading, read the third time, and passed.

Mr. BYRD. Mr. President, I move that the Senate insist its amendments, request a conference with the House of Representatives thereon, and that the Chair appoint the conferees on the part of the Senate.

The motion was agreed to; and the Presiding Officer [Mr. TALMADGE in the chair] appointed Mr. BYRD, Mr. KERR, Mr. FREAR, Mr. MARTIN of Pennsylvania, and Mr. WILLIAMS conferees on the part of the Senate.

ESTATE OF A. A. ALEXANDER

Mr. KNOWLAND. Mr. President, at the request of, and after consultation with, the majority leader, I have been asked to move that the Senate proceed to the consideration of Calendar 2517, H. R. 9262, which is a private claim bill. The purpose of the proposed legislation is to pay the estate of A. A. Alexander the sum of $1,131.50 in settlement of all claims against the United States based on damage done to furniture and household goods belonging to the late A. A. Alexander when that property was shipped from the Territory of the Virgin Islands when Mr. Alexander resigned as Governor of the Territory.

The report of the committee shows that the Department of the Interior has written a letter concerning his claim. The Bureau of the Budget has no objection.

When the bill was called on the call of the calendar the other day, an objection was entered by the majority calendar committee. The Senator from Iowa [Mr. MARTIN] tells me that he has discussed the matter with the Senator from Pennsylvania [Mr. CLARK], who has no objection to having the matter taken up on motion. Therefore, I move that the Senate proceed to the consideration of Calendar 2517, H. R. 9262.

The PRESIDING OFFICER. The bill will be stated by title for the information of the Senate.

The LEGISLATIVE CLERK. A bill (H. R. 9262) for the relief of the estate of A. A. Alexander.

The PRESIDING OFFICER. The question is on agreeing to the motion of the Senator from California.

The motion was agreed to; and the Senate proceeded to consider the bill.

The PRESIDING OFFICER. The bill is open to amendment. If there be no amendment to be proposed, the question is on the third reading and passage of the bill.

The bill was ordered to a third reading, read the third time, and passed.

EXPENDITURE OF FUNDS THROUGH GRANTS FOR SUPPORT OF SCIENTIFIC RESEARCH

The PRESIDING OFFICER laid before the Senate the amendments of the House of Representatives to the bill (S. 4039) to authorize the expenditure of funds through grants for support of scientific research, and for other purposes, which were, on page 1, line 4, strike out "engaged in making" and insert "authorized to enter into"; on page 2, line 13, strike out "Committee on Appropriations and to the Committees on Government Operations" and insert "appropriate committees", and on page 2, line 17, strike out "section 1" and insert "the first section."

Mr. HUMPHREY. Mr. President, I move that the Senate concur in the amendments of the House. They are technical in nature and in no way change the substance or purpose of the bill.

The PRESIDING OFFICER. The question is on concurring in the amendments of the House.

The amendments were concurred in.

AMENDMENT OF PACKERS AND STOCKYARDS ACT, 1921, AS AMENDED

Mr. O'MAHONEY. Mr. President, after consultation with the leaders on both sides, with the members of the

Committee on the Judiciary, and with the distinguished Senator from Illinois [Mr. DIRKSEN], I move that the Senate proceed to the consideration of H. R. 9020.

The PRESIDING OFFICER (Mr. TALMADGE in the chair) laid before the Senate the bill (H. R. 9020) to amend the Packers and Stockyards Act, 1941, as amended, and for other purposes, which was read twice by its title.

The PRESIDING OFFICER. The question is on agreeing to the motion of the Senator from Wyoming.

The motion was agreed to; and the Senate proceeded to consider the bill.

Mr. O'MAHONEY. Mr. President, on May 15, the Senate passed a bill amending the Packers and Stockyards Act. The bill was introduced by the Senator from Utah [Mr. WATKINS] and myself. Hearings were held by the Committee on the Judiciary. After long consideration, the measure was passed by the Senate and sent to the House.

The House, however, did not act upon the Senate bill. The problem of amending the Packers and Stockyards Act was considered by both the Committee on the Judiciary and the Committee on Agriculture and Forestry. Indeed, I think the Committee on Interstate and Foreign Commerce also gave consideration to the measure. But instead of taking up the Senate bill and amending it, the House passed its own bill, H. R. 9020.

I have consulted, as I said, with the Senator from Illinois [Mr. DIRKSEN], the Senator from Utah [Mr. WATKINS], and the leadership on both sides. I am now prepared to ask that the Senate pass H. R. 9020.

The result of the debate, of the action of the Senate, and the consideration of the problem in the committees of both Houses will be an improvement in the present law. I think it would be a mistake to allow this Congress to adjourn without having taken action in the nature of progress as contained in the bill.

Mr. WATKINS. Mr. President, will the Senator yield?

Mr. O'MAHONEY. I yield.

Mr. WATKINS. As a matter of fact, a part of the Senate bill, at least, is embodied in the House bill. I refer to the part with respect to chainstores.

Mr. O'MAHONEY. Yes. The loophole in the present law, by which chainstores escape regulation by the Federal Trade Commission on nonmeat products, is closed in the House bill.

Mr. WATKINS. At least that much progress will be made if the House bill shall be passed.

Mr. O'MAHONEY. That much progress will be made. The Federal Trade Commission is given authority to regulate oleomargarine, margarine, and the so-called hot pursuit amendment, as is provided by the House bill.

By that, it is meant that concurrent jurisdiction between the Federal Trade Commission and the Department of Agriculture is preserved. In one case, the Federal Trade Commission, before proceeding, will consult the Secretary of Agriculture; in the other case, the Secretary of Agriculture, before proceeding, will consult the Federal Trade Commission—so as to avoid duplication. This provision constitutes progress; and I believe the provision should be retained.

Mr. WATKINS. I should like to say that, although it constitutes progress, I hope that sometime we are able to have enacted into law the remaining provisions of the bill which was passed by the Senate. But we shall have to deal with them at some other time.

Mr. O'MAHONEY. Yes; at another session of Congress.

Mr. DIRKSEN. Mr. President, will the Senator from Wyoming yield to me?

The PRESIDING OFFICER (Mr. CHURCH in the chair). Does the Senator from Wyoming yield to the Senator from Illinois?

Mr. O'MAHONEY. I yield.

Mr. DIRKSEN. I think the bill provides for a rather agreeable division of jurisdiction between the Federal Trade Commission and the Department of Agriculture. I know the bill is acceptable to the House, and I know that the agencies concerned can well live with the provisions of the bill.

So I am agreeable to the request of the Senator from Wyoming that the bill be passed. After the bill is passed, if any weaknesses develop, or if, under the provisions of the bill, a satisfactory job is not done, I shall join him, next year, in proposing improvements in the program.

Mr. O'MAHONEY. Mr. President, the Senator from Illinois is very kind; and, naturally, what he has stated will be the purpose of the subcommittee in charge of the bill.

Mr. President, I call for the third reading and passage of the bill.

The PRESIDING OFFICER. If there is no amendment to be proposed, the question is on the third reading of the bill.

The bill (H. R. 9020) was ordered to a third reading, read the third time, and passed.

AMENDMENT OF VIRGIN ISLANDS CORPORATION ACT—CONFERENCE REPORT

Mr. JACKSON. Mr. President, I submit a report of the committee of conference on the disagreeing votes of the two Houses on the amendments of the Senate to the bill (H. R. 12226) to amend the Virgin Islands Corporation Act (63 Stat. 350), and for other purposes. I ask unanimous consent for the present consideration of the report.

The PRESIDING OFFICER. The report will be read for the information of the Senate.

The legislative clerk read the report. (For conference report, see House proceedings of today.)

The PRESIDING OFFICER. Is there objection to the present consideration of the report?

Mr. CURTIS. Mr. President, reserving the right to object—although I shall not object—may we have an explanation of the report?

Mr. JACKSON. Certainly.

Let me say that the report makes two changes in the bill as passed by the Senate.

The first change the report makes is in the provision voted by the Senate in regard to the saline water distillation plant to be built by the Virgin Islands Corporation. The Senate conferees agreed to delete specific reference to the power features of the saline water distillation plant to be built by the Virgin Islands Corporation. Such reference in the bill is unnecesary, because the Corporation has authority, under existing law, to construct and operate power facilities.

The other change pertains to the sale of the corporate assets. Under the Senate version, such sales of assets would have to be made at public auction. Under the conference report, such sales, when in a value exceeding $500, could be made at public auction or pursuant to sealed bids, after public advertisment in either case. Sales of assets amounting to less than $500 could be consummated without public auction or competitive bids. The word "property," as used in the conferees' version of the Senate amendment No. 2, refers to assets of the Corporation, not to products grown or produced in the Corporation's business.

The PRESIDING OFFICER. Is there objection to the present consideration of the report?

There being no objection, the Senate proceeded to consider the report.

The PRESIDING OFFICER. The question now is on agreeing to the report.

The report was agreed to.

AUTHORIZATION FOR SELECT COMMITTEE ON SMALL BUSINESS TO FILE TWO REPORTS DURING THE SINE DIE ADJOURNMENT

Mr. SMATHERS. Mr. President, on behalf of the Select Committee on Small Business, I ask unanimous consent that the committee be given authority to file two reports during the sine die adjournment of Congress. The first of these reports will be entitled "The Role of Small Business in Defense Missile Procurement"; the second will be entitled "Government Procurement—1958."

The PRESIDING OFFICER. Is there objection to the request of the Senator from Florida? Without objection, it is so ordered.

SECOND ANNUAL CONGRESS ON BETTER LIVING

Mr. SMATHERS. Mr. President, I should like to call attention to a unique event which will take place here in Washington next October, and which deserves advance recognition, since we shall not be in session at that time.

From October 6 through October 8, 100 housewives from the 48 States and Alaska will attend the second annual Congress on Better Living. This congress consists of women delegates who represent the families of America, and whose chief aim is to further the link between American industry and those families and their needs in the constant search for new and more universal ways of better living. The Congress on Better Living was developed from the pioneer ef-

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Public Law 85-934
85th Congress, S. 4039
September 6, 1958

AN ACT

72 Stat. 1793.

To authorize the expenditure of funds through grants for support of scientific research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the head of each agency of the Federal Government, authorized to enter into contracts for basic scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, is hereby authorized, where it is deemed to be in furtherance of the objectives of the agency, to make grants to such institutions or organizations for the support of such basic scientific research. Scienoe research. Funds.

Sec. 2. Authority to make grants or contracts for the conduct of basic or applied scientific research at nonprofit institutions of higher education, or at nonprofit organizations whose primary purpose is the conduct of scientific research, shall include discretionary authority, where it is deemed to be in furtherance of the objectives of the agency, to vest in such institutions or organizations, without further obligation to the Government, or on such other terms and conditions as the agency deems appropriate, title to equipment purchased with such grant or contract funds.

Sec. 3. Each agency or department of the Federal Government exercising authority granted by this Act shall make an annual report on or before June 30th of each year to the appropriate committees of both Houses of Congress. Such report shall set forth therein, for the preceding year, the number of grants made pursuant to the authority provided in the first section of this Act, the dollar amount of such grants, and the institutions in which title to equipment was vested pursuant to section 2 of this Act.

Approved September 6, 1958.

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